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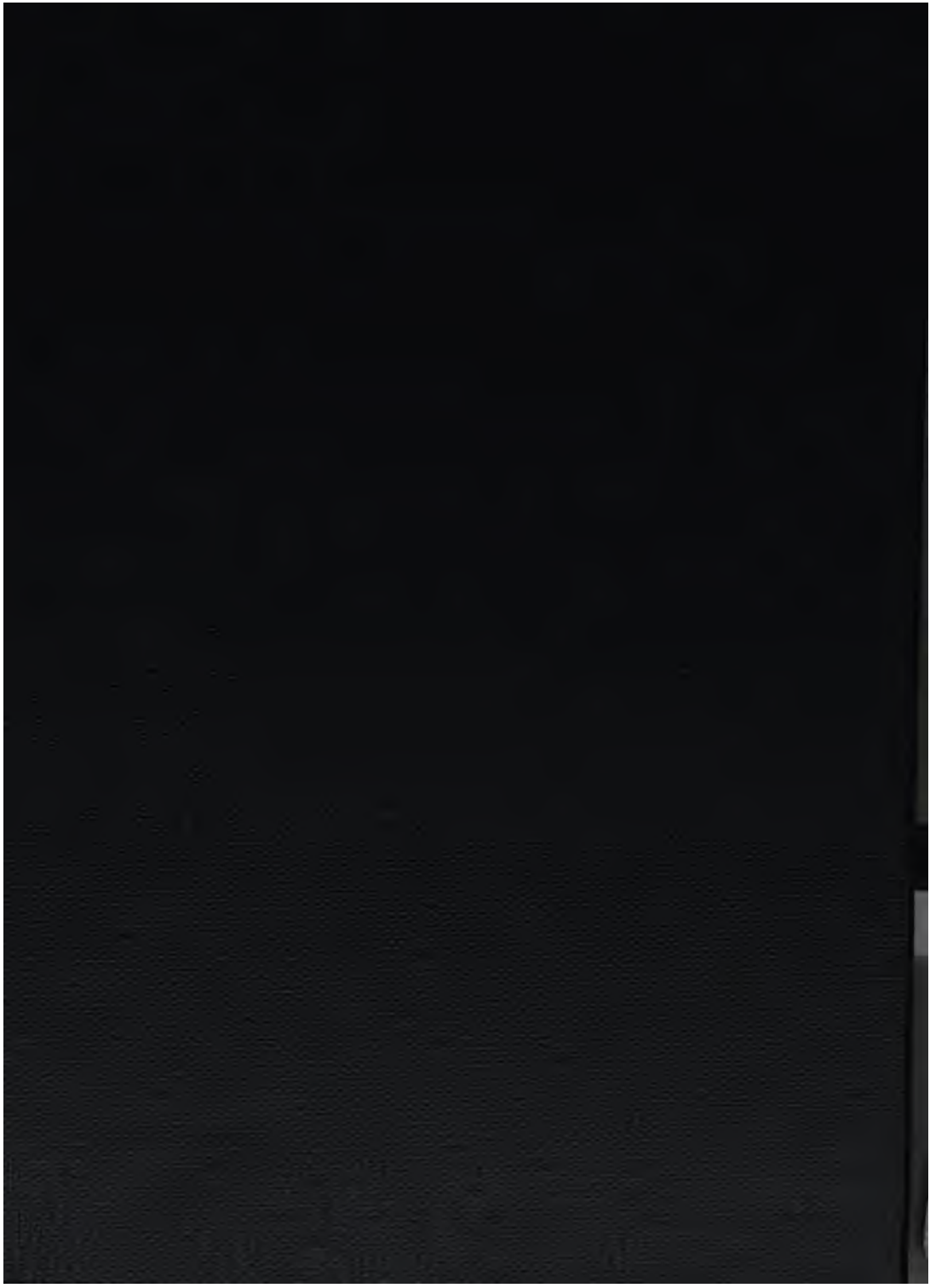

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BY

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TRANSLATED BY

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BY

S. PH. MARCUS, M.D.

SPA PHYSICIAN AT PYRMONT, GERMANY

TRANSLATED BY

R. W. FELKIN, M.D., F.R.S.E., ETC.

AUTHOR OF 'TROPICAL DISEASES IN AFRICA,' ETC.

'All that is wise and clever has already been thought; now we must try and think the thoughts again.'—GOETHE.

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PREFACE

In the following pages the author has brought together some 'afterthoughts,' using the term in its widest sense. He lays no claim either to priority or to originality; should thoughts appear in this book which the reader has not met with elsewhere so much the better.

The author is well aware that he has only been able to consider afresh thoughts which have been considered already by countless thinkers; all he claims to do is to reconsider and restate thoughts which he has heard or read at any time or in any place.

Repetitions and at times a wealth of examples are intentional, in order to render clear thought more easy; the reader who does not need such aids will pardon them.

S. Ph. MARCUS.

Berlin.

TRANSLATOR'S PREFACE

THIS little volume has been written with the object of stimulating men and women to *think*. I trust that it may succeed in this aim in its English dress also.

Materialism is spreading far and wide to-day, and it seems to me that this is largely due to want of sound thinking. The rush and hurry of modern life too often prevents deep or sound thinking, and leads many people to take their views of life and faith ready-made. A great name leads, or misleads, the popular ideas as to what is false and what is true.

Now, Haeckel has a great name (and justly so, for he is a great scientist), and hundreds of his books are being read with avidity by those whose training does not enable them to separate the wheat from the tares, with the natural result that they get mental and moral indigestion. On the Continent some thirty churches have been founded to worship his 'Mighty Atom'!

In this small book the author has sought to

provide, as it were, thought tabloids containing an antidote. He asks his readers not to skim hastily, but rather to absorb slowly and assimilate his tabloids. If they do so, they will doubtless find that, if they possess a moderate amount of common-sense, much can be said upon the other side in reply to that tremendous problem, 'The Riddle of the Universe.'

With regard to the translation, the author has been very anxious that it should be as literal as possible, and it may, perhaps, have suffered in the endeavour to fulfil his wishes. Be that as it may, it is offered with the conviction that no one can read it without perceiving the pitfalls into which some scientists lead their thoughtless followers.

ROBERT W. FELKIN.

LONDON,
February, 1907.

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MONISM ?

I

KNOWLEDGE

1. To human knowledge boundaries are placed.

2. We shall go least wrong in fathoming the nature of things if we consider that to be true which according to our thoughts and feelings is most probable.

3. Human comprehension is unable to ascertain the absolute truth; it associates itself with the consciousness of truth, and thus ascertains the greatest probability, but the result of feeling (or consciousness) being associated with the search is that all knowledge of the most probable is influenced by the personal equation.

4. It is obvious that as no one was in existence at the time when the molten crust of the earth took on its present shape and character, so no one can report what took place then. The scientist who wishes to gain knowledge

of what occurred in the remote past gathers together facts and data, and draws from them conclusions which appear to him to be correct; another scientist arrives at the same facts and data, but interprets them differently, and from them draws conclusions in direct opposition to those held by the former. For example, some mountain groups may be said by one investigator to be due to volcanic action; by another, to erosion. Each of these men may have a large group of supporters who agree with these respective views, according to whether they feel the evidence to be sufficient or otherwise—that is, probable or improbable.

5. All that we see, hear, or feel is quite subjective; that is to say, the things of this world make certain definite impressions upon our ear or other sense organ. From these impressions we conclude that such things are (that is to say, exist), and are of a certain nature or construction.

6. The conclusion drawn from the sense impression as to the presence and construction of an object may be totally false. The object may be of another nature from that which we imagine, or it may even be non-existent.

Suppose a man to knock his eye against a hard substance in the dark; he sees sparks flash

before his eyes, but these sparks do not really exist at all. Or suppose in the night we hear a rumbling, and conclude it to be thunder, whereas in reality it is merely a heavily laden waggon rolling by.

7. One sense impression may often be helped by another sense impression, but all must be controlled by due consideration, in order that the conclusion arrived at as to the existence and nature of an object or occurrence may be accurate.

8. If we follow up the rumbling noise and see the waggon passing by, the eye controls the conclusion arrived at, and proves that the idea of thunder was erroneous. Or, again, during a thunderstorm we may notice a certain trembling of the ground, and the sense of feeling may decide the conclusion as to the cause.

9. Deliberation alone may correct an error in judgment—*e.g.*, that the noise which caused the rumbling as of thunder would not continue so long and with such regular intensity if it were really thunder; or a wanderer in the desert may suddenly see a city appear on the horizon which he knows could not possibly be there, although he sees it perfectly—it must be a mirage, *fata Morgana.*

10. It is not in our power to prove with

absolute certainty the truth or reality of any thing or event, as we can prove that $1 + 1 + 1 = 3$, neither more nor less. We can only prove that it is highly probable, and we must hold this to be the truth. It cannot be held to be absolutely true, for the possibility of an error on the part of all our senses, including our power to draw an accurate conclusion, must be admitted.

11. Just as there is the possibility that all our senses err, so also there is the possibility that they do not err, that they give true evidence concerning the presence and constitution of a thing.

12. That a thing exists in reality, and that it is constituted as our senses controlled by reason bear witness, is the most probable.

13. How wonderful, what a work of art, is the construction of the eye, the ear, and our other organs of sense! Our eye makes it possible for us to gain a knowledge even of things that may be at an enormous distance, as, for example, the stars of the Milky Way; yet the eye can only see what lies before it, not that which is behind.

14. The ear can only receive impressions from a comparatively short distance; but it receives those impressions from before, behind, from all sides.

15. The acuteness of our senses indubitably

surpasses at times our most ingenious methods for proving the presence or absence of certain materials, as in chemical analysis. For instance, if a bottle containing either camphor or musk be uncorked in a room, the room will be filled with its smell; without any doubt whatever our sense of smell informs us that either camphor or musk is and must be present in the room. To prove the presence of these substances by chemical analysis would be an impossible undertaking at present.

16. Is it conceivable that the Creator—or, for those who prefer the term, Nature—should form such wonderful and complicated instruments as the eye, the ear, and the other sense organs with the sole result of revealing things to us which do not exist?

17. Why should it not be conceivable? Is there absolutely no aim to be found in all this? Was the eye not formed with the intention of seeing, the ear of hearing? A mass of original cells may perchance, influenced by external circumstances, have been drawn together to form such organs and, always by chance, attained to this power of organization. And now we see, hear, taste, and feel. Or rather, we believe that we see and hear things for in truth such do not exist.

One may think thus, certainly. What can not be thought?

But is it probable? Is it the *most* probable?

18. The irritation of light causes a number of cells to form the eye; that of sound, other cells to form the ear. By chance nerve fibres are present to enable the impressions of light or sound to reach the perception and judgment of the mind. By another wonderful chance these cells are only formed in the head, and are always duplicated!

Again, the eyes were always formed in front, the ears always on the sides, although light and sound came from all directions. Chance is conceivable — yes. But is it not more probable that from the beginning certain definite cells were given the power of developing into the eye or the ear, and that through their capacity to receive impressions light and sound were first able to attract attention—must, indeed, produce impressions through them?

19. The same thing is not, nor can it be at all times, the most probable. This fact need not lead us astray, but should teach us humility in judgment.

20. New experiences are daily possible, and liable to alter our conclusions respecting the existence or constituents of things.

21. Just think of the impression which would have been produced and the alteration of opinion necessitated in the Middle Ages on the working of Nature's forces if our present-day knowledge of the wonders of electricity, the telephone, the Marconigraph, or the Röntgen rays, passing through solid bodies, had been known then!

Consider how greatly our own views as to the composition and working of all matter have been changed by recent chemical and physical investigation.

22. Things which are given out as being scientifically proved often only rest upon the teaching of a certain school of thought, and hold the field only so long as that school maintains its ground.

23. This is true of the present time, and much that is held to be fact is only fashion.

24. And how should it be otherwise? Is not much that is proclaimed as a certainty only a probability, and not proved so as to leave no possibility of mistake, as with the inevitable logic of the progression of numbers?

25. No mere change of fashion can alter the logical law of numbers. So $1 + 1 + 1$ always $= 3$, and can never make more and never less.

26. That which is against all human experi-

ence, and which shows itself daily and hourly to be false, cannot be true merely because it is conceivable.

27. It is conceivable—and it is held to be so by philosophers—that all which happens, happens simultaneously; that past and present and future are only ideas which arise in the activity of the human brain.

28. It is easy to imagine eternity in futurity, time that will never have an end; but it is most difficult for us to conceive eternity extending to the past—time that never had a beginning.

29. A block of granite knows nothing of the past nor of the future. Perhaps it is right in agreeing with the philosophers, possibly not. It knows nothing of the present either.

30. Possibly the sun rises and sets at the same time; possibly we die in the same moment as that in which we were born, and live a lifetime in the same moment. Possibly, but possibly not. Which is the more probable? What seems to satisfy the highest probability? That those occurrences took place at the same time, or that they followed each other in succession?

31. A piece of iron fell from the roof of a house; if it had fallen a second sooner it would have struck the passing philosopher to a cer-

tainty. 'That is not what I meant,' says the philosopher, and jumps aside. 'You do not understand my teaching;' and so pursues his way gloomily.

32. It is possible to imagine all matter removed from the world, but the space it occupied still remains as before.

33. Space has no limit; it is boundless.

34. The same may be said of time. Suppose we calculate in æons—add to them, subtract from them, backwards and forwards; there always remain incalculable æons in both directions.

35. Space was and is universal and boundless; time was, and is, and always will be, eternal.

The Talmud took a wonderfully deep view when giving the name המקם (*hamakom*, space) to God. He is, as space is, boundless, the Absolute Universal, the Omnipresent. And יהוה, Jehovah. He is, as time, the Everlasting, past and present and future.

II

MATTER

1. ALL matter that we can perceive with our senses upon earth is either living or dead, organic or inorganic.

2. Inorganic matter consists of the metals, stones, gases—in short, all simple bodies, elements, from which the world has been built up—and certain chemical combinations of elements, such as water, carbonic acid, etc.

3. Organic matter consists of mixtures or chemical combinations of simple elements only to be found in the bodies of plants and animals.

4. Plants and animals can by their innate vital processes collect and assimilate inorganic matter such as oxygen, hydrogen, nitrogen, carbon, sulphur, phosphorus, iron, etc., from which substances they maintain themselves, grow, and multiply.

5. At the death of a plant or animal dissolution commences, and disorganization of the organic matter, by disintegration into its component elements, takes place.

6. These elements return to the great storehouse from which they have been taken by the living organisms.

7. This storehouse is therefore as inexhaustible as the sea, to which all water which has evaporated from it either returns as rain or flows back in the rivers and streams.

8. Water, in whatever form it may present itself, whether as hard ice, as snow, clouds, steam, or invisible water-gas, is always water (H_2O). It can at any time pass from one state to another; but in whatever state it may be, whether boiling or frozen, it always remains water.

9. The iron which circulates in the blood in the red blood-corpuscles and tinges the maiden's cheek with a rosy hue is the same element as that composing the rails upon which the train thunders along. It may have formed a rail once, or it may do so in the future. All inorganic matter behaves in exactly the same way.

10. The elements from which all inorganic and organic bodies are built up are present in definite quantities upon the earth—that is to say, are contained in or on the earth.

11. These definite quantities have been in or on the earth from the beginning.

12. Our globe was formed from certain elements, and, according to astronomers, was once, together with the other planets (of this system),

part of the sun, before they were cast off and sent whirling through space.

13. The earth consisted of certain elements at the beginning, and still consists of the same; it does not now contain an atom less, be it of metal, gas, rock, or water, than at the first. To-day there is the same quantity of gold, silver, copper, iron, chalk, oxygen, hydrogen, nitrogen, and so on, as there was on the first day of the earth's existence.

14. Whatever may be the fate of the earth—whether it becomes, like the moon, a lifeless, airless, cold, stony mass, and as such for everlasting rolls through space, or whether, owing to a cosmic catastrophe, it dashes into another star, and so new conditions arise, yet will it never lose a single atom which it at present possesses, or which it may possibly take as its dowry to its marriage with another star.

15. All matter that once belonged to the earth remains, nor can it ever escape or fall away.

16. The earth is powerless to gain any more elemental matter of itself. It is, however, possible that there may be a slight addition to the elemental matter, due to shooting stars or meteorites.

17. However relatively small in quantity,

some addition to the earth from meteorites must take place.

18. This addition to the earth's bulk, however, may be balanced by small particles of the earth becoming detached and flying off as shooting stars to end their course in other worlds. Nevertheless, no fact is known that supports the view that the earth's gravitation ever permits even the smallest particle to leave its sphere of attraction.

19. The following considerations based upon well-known facts lend no support to the teaching that the whole of the solar system sprang into being from a nebular mass, our earth and its fellow-planets being formed from it, with the sun as the nucleus.

20. Floating in space, that nebulous cloud must have had the same temperature as space, and this temperature is estimated to be hundreds of degrees below freezing-point. There seems to be no likelihood, therefore, of the production of heat anywhere.

21. All the inorganic matter which to-day forms the sun, the planets, and the earth, must have existed in that nebulous mass.

22. We know that earthly matter can be concentrated, condensed into stone by cold. Gases may be turned into fluids, fluids into solid bodies,

by cold. Solid bodies shrink under its influence, occupying less space as they become denser.

23. The spaces between the joints of steel rails are wider in winter than in summer. Mercurial thermometers cannot be used in polar regions, because the quicksilver turns to a solid body.

24. It is impossible to cause solid or fluid matter to expand into a gaseous condition by means of cold.

25. It would be possible to imagine that all the stones, metals, and metalloids which at present constitute the earth might have been present in that nebulous mass if it had had the requisite temperature. This high temperature could only have been produced—if it were produced—by the sudden or gradual condensation of the nebular mass, and every constituent particle of the earth must have existed previously in that nebular mass.

26. If all matter was originally of one nature, as monism teaches, then it must have been produced out of that nebulous mass, which must have been homogeneous throughout.

27. What happens? The nebulous mass becomes more and more condensed, and, behold! by means of heat and pressure the pre-

viously homogeneous matter becomes changed into various constituents. Flint, iron, lime, sulphur, quicksilver, carbon, lead, oxygen, gold, phosphorus, sodium, chlorine, and the rest, are formed, and, in short, the homogeneous mass is changed into the most complex series of inorganic substances—into the earth itself with its atmosphere. It is indeed possible to believe in such a state of things, for it is possible to believe anything. But do not call upon physical science to uphold this solution of the riddle of the universe.

28. Again, even if one considered that differences of atmospheric pressure and temperature upon the earth's surface and in its interior had an influence in forming the variety of the material constituting the globe from the monists' nebulous mass, yet this goes against all the experience of natural science.

29. Heat and pressure can cause matter to contract or concentrate; they can alter its aggregate condition (solid, fluid, or gaseous). Yet, whether they influence any matter greatly or not, to turn its elemental composition from one element to another—*e.g.*, oxygen to copper, or hydrogen to chalk—is beyond the power of any amount of heat or pressure. And let it be remembered that very high temperatures

(3,500° C.) have been obtained in electric furnaces, and thousands of tons of atmospheric pressure altered by high explosives.

30. Even with the possible objection that we are unable to make use of the enormous heat and pressure which may have been at the disposal of the globe, yet the transformation of the monists' nebulous mass into the elements composing the earth is not plausible.

31. Water, or even ice, if evaporated, becomes H_2O. A snow-field or a frozen sheet of water may become gradually thinner or smaller till it disappears entirely, even when a continuous frost of many weeks' duration obtains. This fact might lead one to imagine that the nebulous mass may have consisted of pure water, for it could exist as gas at a very low temperature. And, further, that out of the water molecules composing the nebulous mass the earth's constituents could have been produced by heat and pressure.

32. It is impossible for anyone indubitably to disprove such an assertion. Why, then, should it be impossible for Nature to transform into metals and rocks oxygen *and* hydrogen, the two constituent gases of water, not merely as well as, but more easily than, the monists' nebulous mass, which consisted solely of hydrogen?

33. The view that from water anything else but water could be formed at any time may be just as much believed in as that of oxygen being turned into hydrogen; and Heaven knows what else has happened according to the monists' nebular theory!

34. The same belief may be accorded to fanatical theorists as to the views held by that most credulous of beings the charcoal-burner.* Many a one laughs at the ready belief and holy simplicity of those minds which accept as absolutely true the teachings of their Church, who are themselves just as credulous of the greatest wonders if clothed by a mantle of pseudo-science.

35. Just as the natural perception rebels at the idea that without a miracle pure water could be converted into phosphorus, so must the unbiassed thinker reject as incredible all theories which, like the monists' of the original oneness of matter, set on one side the opposite experience of natural science.

* Charcoal-burners (*Köhler*) are in Germany said to be the most superstitious and easily fooled people in existence.

III

THE LIVING ORGANISM (1)

1. So long as man has been able to observe scientifically, no living organism has ever been discovered which has been produced by chemical materials pure and simple.

2. Every living organism springs from a living organism.

3. The attempts to produce the lowest form of life—cells—artificially have led to results which have induced their authors to regard them as living organisms, owing to their showing a capacity for enlarging themselves—namely, growth. They increased in bulk, but not in number; they did not multiply.

4. Simple matter, as well as living organisms, may display growth, movement, and the production of warmth.

5. If one makes a concentrated solution of crystalline matter, it is found that upon the facets and edges of the crystals new material has gathered, and in this way a small crystal may become larger.

6. Matter is expanded or contracted by heat or cold. It may present the appearance of motion, as hygroscopic substances increase in

size as they take up water and decrease as they lose it.

7. The production of heat is found in very many of the chemical changes of matter, as, for instance, in slacking lime.

8. Living organisms have the following properties not possessed by dead matter: assimilation, metabolism, multiplication, and feeling.

9. Assimilation is understood to mean the ability of a living organism to take up into its body the raw material, and change it into such a form that it becomes identical with the bodily construction of the given organism.

For instance, a tree assimilates the carbon which its leaves draw from the carbonic acid in the air, and turns it into wood. The elephant takes the chemical material contained in a truss of hay and builds it up into its mighty body.

10. One could only speak of assimilation in non-living matter if it were able to draw into itself from a complex body the particles of matter required for itself—*e.g.*, if one placed a piece of sulphur in albumin, and the sulphur were able to extract sulphur contained in the albumin molecules and incorporate it.

11. Every living organism possesses the power of tissue metamorphosis—*i.e.*, a continuous assimilation and elimination of matter.

12. The chemical atoms from which the living organism is built up possess neither singly nor when they are brought together the power of metabolism.

13. Living things can propagate themselves; things not possessing life cannot.

14. Feeling is possessed by living things alone.

15. If the high and highest living organisms have developed themselves, and still develop, from the lowest, these latter must have had, and still have, feeling.

16. Even though the feeling were never so small, hardly recognisable, yet it must have existed already in the lowest stage of life, the original cells; otherwise it would be incomprehensible that the higher living organisms should acquire it.

17. The mimosa (*Mimosa pudica*) folds its feathery leaves, and they sink at a touch.

The Venus's fly-trap (*Dionæa muscipula*), at the lightest touch, say of a fly, folds the two edges of its leaves together quickly, enclosing the insect till it is dead and the irritation caused by its movements ceases.

18. In both plants touch excites movement.

As plants have no cerebro-spinal system or

corresponding organs, they cannot possess feeling as individuals.

19. It is possible that the movement of those leaves is due to a purely mechanical cause, the pressure of the insect calling forth an alteration in the tension of the leaf, just as, for instance, an indiarubber film rolls together if pressed upon at one point.

20. It is possible, also, that the cells of that part of the plant feel the changing touch, and this causes their protoplasm (cell contents) to expand or retract, so causing the movement.

This view is supported by the fact that the contraction of the leaves ceases as soon as the fly is dead, therefore motionless; but the weight which the insect imposes on the leaf still remains.

21. Concerning certain of the smallest living organisms, naturalists do not know whether they should be classified as belonging to the vegetable or animal kingdom.

22. Such organisms are called transition forms (from plant to animal).

23. Such transition forms can only exist if all living organisms—plants and animals—were identical in their original condition; if consequently all animal organisms were once vegetable organisms.

24. The reverse—that vegetable life developed from animal life—contradicts the law of Nature which ordains the progressive development of all organisms.

The midge which lives but a day is a more highly developed being than a thousand-year-old oak-tree.

25. Those investigators who find an enormous difficulty in thinking it possible—be the external conditions never so favourable—for a plant to develop into an animal (say, the development of a cherry-stone into a rattlesnake) are of the opinion that the original living organism, the primeval cell, originated in a dual form. One form had the capacity to develop into plants, the other into animals.

26. Other investigators hold it to be impossible for one species to become another even within the vegetable kingdom, and the same with regard to the animal kingdom; for instance, that a cherry-stone could evolve into a leek, or could ever have been a leek, or a green fly into a kangaroo. On this account they hold the view that the primeval cells were differentiated from the beginning for the various botanical species, or in various zoological species respectively.

27. The one opinion is just as arbitrary as

the other. The latter is preferable, because it is not in contradiction to anything we observe in the living organisms.

28. There is nothing startling if, owing to external circumstances (nature of the soil, moisture, manure, and climatic conditions), a radish takes on the form of a parsnip, or a dog which has run wild becomes like a wolf, both in nature and external appearance. Both remain in the same natural order as hitherto.

29. No cultivation can cause the radish to become a peach, nor could a dog running wild ever become an alligator.

30. A glance into a text-book of botany or zoology shows the abundance of totally different species of plant as well as animal forms of life.

31. Living forms are never found showing themselves in a state of transition from one perfectly different species of plant or animal into another.

32. Nor upon the layers of stone upon which the world's history is written is there to be found any record of gradual transition of one living organism to another variety of any kind of being having taken place. They record much more certainly that in various periods, separated by long intervals, other and higher

species and families have appeared by leaps in the different geological strata.

33. It would almost appear as if, in the long periods existing between the formation of the older and later rock strata, the Architect of the world were at work in the laboratory remodelling and perfecting the previously created beings.

34. If all organic matter the most diverse originates from primordial cells, how enormous must have been the difference even in them!

35. And if, indeed, the various forms of living organisms collectively sprang from various forms of primordial cells, is there, then—considered as a matter of scientific natural history—so great a difference essentially between this teaching of the method of the creation and that given in the Bible?

36. Is it fundamentally different when the Bible teaches that God created the grass and the herbs and the trees bearing fruit, thus showing the perfected results of His act of creation, and when science teaches that there were cells, seeds out of which at length grass, herbs, and fruit-bearing trees and all living organisms developed?

37. Is the result other than if a hippopotamus all complete sprang grunting out of the mud, or if it grew to its completion from within a simple cell?

38. Does not this miracle appear daily before our eyes? The mighty Indian elephant commenced its existence as a simple microscopic cell, in which it lived in its mother's womb. Just as with every animal, so with man.

39. But this cell must produce an elephant, that another species of animal, that other, man. They must, because they are these already.

40. In fact, does not science, with its abundance of various primordial cells, teach the same as the Bible, the only difference being that science teaches the steps of development in organic creation, whereas the Bible passes it over? Development was not of importance for the objects which the Bible had in view—solely the teaching that the Almighty created all things in the heaven and in the earth, and all organic and inorganic matter.

41. 'God created.' This expression pains some people; they call it 'Nature,' and imagine themselves to formulate who knows what clever aphorism in so doing.

42. Our human thinking and feeling, from which we cannot escape, demands the necessity for that which was to be first having existed in thought and intention before being created.

IV

THE LIVING ORGANISM (2)

1. ACCORDING to the monists' view of the world, all living organisms were at their beginning perfectly identical—innumerable quantities of small one-celled microscopic bodies all formed out of the primitive organic matter, the so-called protoplasm, all with the same identical powers, the primordial cells.

2. One thing, however, was perfectly different in any case, and that is the place they occupied; for it is absolutely impossible to conceive that in all the world *two bodies* can occupy one and the same place at the same time.

3. So single cells or masses of cells may be influenced in various places in diverse ways by the forces of Nature, owing to the position in which they were placed.

4. Light, moisture, heat, electricity, atmospheric pressure—in short, all local conditions—could, or rather must, influence in various ways the cells which otherwise are of a like nature. According to the circumstances or conditions under which they were developed, whether at the poles or in the equatorial regions, upon the surface of the earth or in its

depths, on the mountain heights or in the valleys, under burning sun or in constant darkness, on the dry land or in the sea, so must they have been influenced.

5. And these different effects of a single force of Nature, or all or several forces combined, compelled the cells—each single one of which was able to become any creature which the earth bears or has ever borne, just as each of the great Napoleon's soldiers carried a marshal's baton in his knapsack—to assume their ultimate form.

6. In this way at length one primordial cell formed itself into a gourd, another into a rattlesnake, another into a rose, another into a tapeworm, another into a gnat, or another into an elephant; this one into parsley, this other into a shark.

The one only got as far as a yeast bacillus, the other became a lion; from one was formed a date-palm, from another a leech. And so on throughout the whole series of higher or lower plant and animal kingdoms.

7. And all these very extraordinary differences occurred owing to the place in which the primeval cell found itself, and to the strength and duration of the various influences of Nature's forces, such as light, heat, and so on.

8. It is possible that there may be cells which, owing to their environment, were exposed to the forces of Nature in such a small degree that, notwithstanding their universal power to develop, they remained as they were, or as they still are, if they have not died out—protoplasmic, primordial cells, just as every soldier of Napoleon's army did not become a Field-Marshal, notwithstanding the possibility of so becoming which he carried in his knapsack.

9. It is conceivable that all this has been so, has become so. Is it probable ?

10. As the cells were at one time fashioned, so they remained for all time. The further action of Nature's forces under the limitations of local conditions could not, throughout innumerable millions of years in which it acted, change much in their condition.

11. Nor, again, was there ever either a degeneration known to a primordial cell or a transition to anything quite different—say of an octopus to a lobster, or a gorilla to a nightingale, or a pea to a cucumber.

12. In animals which have been compelled to live always in the dark, eyes are formed in the same position in the body as their atrophied eyes as soon as they are placed under the influence of light.

13. For unknown millions of years the sun's rays have beamed day after day on the tropics. But no palm has ever received eyes from its light to see withal, nor ears and hearing from the parrot's call, or the thunder of heaven or sea. Notwithstanding all irritation from light and noise, the tree cells have only been able to produce a date or cocoanut palm.

14. The effect of light on the leaves or flowers of certain plants, causing them to open and shut, to expand or contract, by day or night, is not seeing; for seeing requires that specially constructed organ the eye, which is always found, and always will be found, in all creatures which possess the faculty of sight.

15. *Preceptor.* Does the theory that the most various and different species of plants and animals are to all intents and purposes constructed by the different working of natural forces upon (in every sense of the word) the homogeneous organic particles—the primordial cells—rest upon a more certain scientific basis than the belief that it was so?

Disciple. One is obliged to admit this truth: that at the *present* time such processes are not observed—that is to say, that they give now no basis for the belief that heat, light, electricity, or any other of Nature's forces, accord-

ing to its duration and the strength of its action, can turn an onion into a hawk or an electric eel into a cockchafer or an apple-tree.

P. Was it not always as it is now?

D. The influence of Nature's forces might have been far more powerful at that time; for example, the temperature of our earth, whose crust had only just hardened, must have been extraordinarily high.

P. At the time of the production of the plant and animal kingdoms in whatever forms the temperature could not have been over 100° C., for at that temperature water, the chief constituent of plant and animal life, evaporates as steam. A high forcing-house temperature may have been obtained, but it must have been *under* 70° C.; if not, the albumin, a considerable part of all organisms, would have coagulated. Very high mean temperatures still act on the protoplasm of plants in the tropics, in the dog-days in our own land, or in forcing-houses. The temperature could hardly have been 10° C. higher at the time of the formation of the primordial cells, unless they were destroyed at once—if, at least, their origin under such conditions is conceivable at all.

D. It is possible that 10° C. higher tempera-

ture acting for hundreds, possibly thousands, of years could have done something.

P. Certainly; for instance, a lemon might have become as large as a gourd, or a grass-blade like a palm-tree. But 10° C. more heat can act as long as you like upon a lemon-tree, yet a goat will never grow upon it, and a blade of grass will never develop into a humming-bird. What analogue can be found in Nature to justify the midsummer night's dream that a difference of 10° to 20° C. of temperature could compel one primordial cell to become a lemon, another a goat?

D. But the electric, the magnetic conditions, the moisture in the air, might all at that time have been different to what we experience now.

P. Yes, different, perhaps; but not so essentially different, not so immensely different, that one can attribute to them so tremendous an action. The air could not have been more than saturated with moisture at any time. More than a certain amount of electrical tension between the clouds on one side and the earth on the other, or between the clouds themselves, could not have been present then without a flash of lightning re-establishing the balance. Concerning the action of earth magnetism we know nothing even now, save that it causes the

needle of the compass to point to the north. We have not the least proof to support any idea that Nature's forces were different then to what they are now.

16. *P.* Just as the possibility of a creation in its whole or in its parts may be thought to be without purpose or goal, so there must be the possibility of a teleological conception of all that has been and is being created—that is to say, creation may have had a deliberate purpose and aim in view from the beginning.

D. It is considered to be unworthy of science to seek for purposes alone.

P. Is it unworthy to observe them when they lie clearly before the eye? It is possible to think that the eye or the ear formed themselves, and that therefore one hears or sees. It is also possible to think that the eye and the ear were formed *in order that* we might see, in order that we might hear. The question is only to which of the two ideas is to be attributed the greater probability.

The primordial cells may at their origin have been perfectly homogeneous; they may just as well have been completely differentiated—differentiated in so far as there were in them slumbering principles of the most varied forms of life and possibilities of development. It may be

said that the primordial cell was formed with a definite innate tendency in some direction, that every primordial cell could only become what this tendency compelled it to become. The various influences of sun, moisture, soil, etc., might well cause certain primordial cells to evolve into crab-apples, which at another time, under similar conditions, would have become ribstone pippins; but these cells could never evolve into a chamois or an owl.

D. From the forces of Nature known to us such a thing does not seem likely to happen; but other forces of Nature still unknown to us might have been at work once.

P. Very well, then, I take these 'unknown forces of Nature' into consideration and ascribe to them the work of giving the primitive cells a tendency, and, indeed, the most varied tendencies.

D. But is that not merely an arbitrary conception?

P. Is, then, the idea of still unknown forces of Nature less so? All the forces of Nature are to be considered as being continuously and permanently at work. They must, therefore, exert their influence at the present day.

D. Well, why not?

P. We never see a grape develop into a frog.

it be a riddle if the creative Nature always acted in the same way? Or would it be more comprehensible to hold that the same processes of Nature, which have always shown themselves identical ever since man has learnt to observe them, have acted in the same way, even at the very origin of living organisms?

D. We should consider the natural and self-evident.

P. Well, now, we do not meet with 'unknown forces of Nature' anywhere, but throughout the entire organic world a tendency—a predestination.

D. How so?

P. An acorn contains potentially a whole oak forest. All that is required is the stimulating influence of soil, water, light, air, and heat *to act* upon it, and then the acorn must perforce grow into an oak. The tendency which is inherent in the seed is a part of its being—indeed, essential to it—therefore the acorn cannot become anything else. It may, owing to its environment, become a crippled, dwarf tree, and so wither away, or it may become an oak forest extending for miles; never, however, under any possible circumstances, could it become a potato-field or a flock of sheep.

D. Certainly, it never does so.

being a first step in the development they subsequently attained?

P. This primordial material, protoplasm, still continues to exist. It is to be found both in animal and in vegetable organisms as a jelly-like, homogeneous mass, capable of putting forth processes and withdrawing them—capable, that is, of movement. For instance, some of the lowest forms of animal life, the amœba and mycetozoa, are mere protoplasm—at least, their soft parts are, as in the rhizopods, as well as the contents of many cell membranes.

The formation of primordial cells from this protoplasm has, however, never been observed.

D. It is not necessary that this protoplasm should be completely identical in formation with the primordial protoplasm. However that may be, the differentiation of the primordial cells must have been due to forces of Nature still unknown to us.

P. Or to the tendency in the primordial cells —the inevitable predestination to become what they ultimately did become.

D. But such a tendency would be a perfect riddle.

P. Yes, I concede it is a riddle where it originated; but not so great a riddle as the imaginary 'unknown forces of Nature.' Would

D. That is the case now, and, indeed, may always have been so.

P. The former is certain, the latter extremely probable.

D. But at one time or another the forces of Nature must have implanted that tendency in the cells, cell masses, or tissues of the vegetable and animal kingdoms.

P. And so impressed them that they always and invariably remain the same?

D. The primordial cells may have been of such a kind that the impulse once imparted to them continued to work on in this way.

P. What a strange thing for the forces of Nature to fail just at this point, and at this point only! Magnetic and electric bodies gain and lose these properties; warm substances become cold, light things dark, dry things wet, and *vice versa.* All these properties alter; they may expand or contract, vary in their powers of adhesion and cohesion; they may move or remain quiescent —*e.g.*, Crookes' radiograph. But before the primordial cells they halt; the forces of Nature stand powerless before the products of their own creation. To alter their properties of being is impossible to the Almighty Power which certainly created their activity. They could so influence matter that a frog or a turnip

was at length formed; but so long as they are frogs, frogs they must remain: they could not become turnips. The forces of Nature are now only able to modify or change the external appearance—from all essentials their constant, everlasting influence glances off. The creature had become more powerful than its Creator at the moment He formed it!

D. Improbable enough! I see that with the forces of Nature there is not much to be done in this connection. If organic substances, even up to the highest living organisms, had been developed from the simple elements, the primordial cells, a tendency to become so must have existed in them from the beginning. But whence does this tendency arise? What view do you hold?

P. For me it is sufficient if you admit the point.

18. *P.* Is that creative power *less* deserving of wonder that causes the smallest, most formless and unlikely material to come gradually into existence, to evolve, forming themselves one out of another, into the most varied, greatest, most beautiful and excellently perfect beings, with the power of self-development? Is it more wonderful to form anything and everything out of nothing, in full perfection, in a second—just as in a fairy-tale a magician with

his wand—or to cause everything to appear gradually out of a formless mass?

D. The result is really the same.

P. Does science diminish the power of the Almighty if it sees itself compelled to declare the constitution of the earth, of its component parts, of its productions, of its living creatures and their qualities, and its prehistoric remains, by asserting that all organic matters originated gradually one from another?

D. Science does not declare that the Almighty could not have acted in another way. Science contents itself with simply stating how everything has become what it is.

19. *P.* If one cannot agree with the view that the final form to which each cell could develop was implanted in it at its origin once and for all; if it is more conceivable that in every cell an innate capacity lay to become a certain living being, then it follows that the highest creatures are also the oldest.

D. You mean that they have the longest developmental period behind them?

P. Yes, and the lowest creature the shortest; according to which, the latter must be of comparatively recent origin.

D. But that would require a continuous production of new primordial cells.

P. And with it a continuous development from the simplest and smallest to the greatest and most complicated—a steady, continuous movement of the whole of organic nature forwards and upwards.

D. Æons must have passed before an amœba developed into a mollusc, a fish, a bird, a mammal, an ape, and at last into a man.

P. And how many species it would have to pass through among the vertebrates alone—fish, amphibia, birds, etc. !

D. The time which all this requires is no difficulty, for it lay in the 'everlasting,' and therefore could not possibly be measured.

P. Not altogether. That time had limits. It lies between that moment when the earth's crust was so cooled down that it was possible for life to appear and the present day. It is really estimated by the rock formation with fair accuracy.

D. In such a matter a few hundred thousand years more or less may be immaterial.

P. Just so ; but as to the time required for an amœba to develop into an oyster, cockchafer, salmon, owl, rat, kangaroo, orang-outang, and, finally, man, there is absolutely no data.

D. Data are not wanting, however, to prove the occurrence of such developments in Nature,

if not in such swift and direct succession. There are living organisms to be found which we do not know whether to class as vegetable or animal.

P. Possibly the difficulty may lie in our definition of the two classes of organisms, and the fault may be there.

20. Is an explanation of the very first cause of things found supposing that certain proof could be produced that all living organisms have evolved from one, or even from a few, species of primordial cells which matter—*e.g.*, oxygen, nitrogen, hydrogen, carbon, the metals, etc.—had the capacity to form?

Whence came such intelligence in the oxygen, carbon, iron, etc.?

V

THE LIVING ORGANISM (3)

1. THE scientific investigation of the process of the evolution of the organic creation led to the discovery of a natural law that all living organisms progress gradually to perfection.

2. The man of science knows that this does not mean an unbroken chain of progressive perfection from one individual to another, but

rather that this law recognises the progressive development within the orders and classes of plant and animal individuals.

3. But where does this innate striving originate for progressive and more perfect development, which we find in Nature?

4. It is quite certain that oxygen, hydrogen, nitrogen, sulphur, do not in themselves alone possess this progressive impulse, since they are entirely incapable of any further development. They all remain what they are—oxygen, sulphur, and the rest.

5. Can a body which consists chiefly of a combination of these elements possess something else, some attributes and abilities other than the attributes and qualities which those elements singly or in sum total represent?

6. If a piece of gold, silver, or copper, each taken singly, could not move of its own will, could it be supposed that if they were all smelted together the combination would develop legs and run away?

7. If hydrogen, oxygen, carbon, nitrogen, and sulphur combine in definite proportions and albumin is formed, can this substance show life if absolutely nothing else be added to it? Can it move, feel, grow, propagate, show signs of striving after further development and improve-

ment in itself or in its progeny? Certainly, the elements of which it is composed and into which it can at any time be resolved possess absolutely none of those qualities!

8. Is it according to human experience and consideration of the highest probability that a certain something must have been added to the chemical constituent from which the living body has been formed, which gives to it the possibility of living—powers which could not have been contributed by the chemicals, since they did not possess them?

9. Or is it of the highest probability that iron, carbon, chalk, etc., possess feelings of pleasure and dismay?

10. Perhaps it is possible to regard certain chemical actions which occur as representing the expression of feeling in the material?

If, for instance, a piece of chalk is thrown into vinegar and gives off its carbonic acid, its lime enters into a chemical marriage with the acetic acid. Possibly the lime is mad with rage at having to separate from its dear spouse, with which it was united by a weaker chemical bond; or perhaps the bubbling is a joyful marriage song with which the faithless being throws itself into the arms of its new partner who is eagerly aspiring to it?

11. And then, must each one of the innumerable molecules which made up the piece of chalk not be in possession of so much feeling that they experience the pain of separation or the joy of union, and may they not even be capable of expressing the feeling? 'Credat Monistes Apella!'

12. Matter never dies, it is indestructible; living matter dies, it is destructible.

13. A celebrated scientist of the present day* has been led by his studies of certain bacteria and infusoria to the conclusion that a unicellular organism is to be considered immortal as to both soul and body.

14. Further investigations will show if this view is correct. Be that as it may, those living beings are destructible; the elements from which their bodies are formed are not.

15. Living organisms such as bacteria and infusoria continuously separate themselves by division into new individuals; even higher animals, such as tape-worms, can form several individuals by direct division, each part growing to maturity and again dividing.

16. A pound of iron cannot of itself become two pounds of iron.

17. The increase of living organisms has

* Metchnikoff, *Med. Woch.*, Nos. 43-44, 1905.

certain limits. It can only continue so long as there is a sufficient quantity of the requisite matter upon the earth unused for the building up of bodies, until fresh material is set free by disintegration at the death of other living organisms.

18. Were the living organisms immortal their number must have been limited; their increase must have ceased at the moment when all the material needful for their existence upon the earth had been used up.

19. Science teaches that the more highly developed organisms have evolved from the lower. Therefore it follows that if the latter were immortal the whole organic creation must have come to a standstill at its first commencement.

20. The necessary material suitable for building up the organisms then in existence would have been used up by them, and if not quite exhausted, yet there would only have remained sufficient for a very slightly higher development.

21. What enormous masses of lime and carbon, for instance, are represented in the general storehouse of the earth in the material restored to it by the rhizopods, shells, and corals, as well as the organic waste found in coal-

fields, bituminous oils, and so on, in or upon the earth.

22. If all these organisms had been immortal, taking it for granted that there was enough material at hand and at their disposal, and that they were able to form themselves at one and the same time, yet it seems obvious that that material could not have been sufficient for the formation of higher and the highest living organisms.

23. Should these living organisms be able to evolve through higher to the very highest forms of life, they must be mortal, and yield their material basis for further use.

24. *D.* But why is there such an abundance of species? Why must the lower organisms exist in such countless numbers? Could there not have been fewer of them? Again, if they were immortal, could sufficient material have been present to enable them to develop to a higher stage? We certainly see the first origin of every human being in a single-celled, apparently most simple being—the ovum, and from that develops the very highest—man.

25. *P.* Do not let us ask Nature, 'Why?' but rather, 'How do you do it?' And, at first, we shall content ourselves with the fact that those, the lower forms of life, were so numerous,

and that therefore they must have been mortal; thus their impulse to further development could arise, always provided that the development of the living organism depended upon the stock of material in existence.

VI

THE LIVING ORGANISM (4)

1. FROM generation to generation of mankind the individual inherits capacities, qualities, and experiences, the animals capacities and qualities only.

2. The spider transmits its ability to spin webs to its progeny; each individual must, however, gain its own experience in the art of catching flies.

3. The spider of to-day spins her web just as well or as clumsily as the spider of a thousand years ago; many flies are caught, and many escape before the eager spider can seize them.

4. The experience which a wily old spider may have gained will at length enable her to seize her prey at exactly the right moment every time; but these experiences remain her personal property which dies with her—at any rate, she cannot

transmit them to her offspring. And there are no schools for spiders where experiences of the old are communicated impressively to the young.

5. Certainly, Nature carries on teaching in place of this, so far that perfection to a definite degree is attained by cultivation of capacity; clever individual animals mate by chance with other clever animals, and so from them spring clever varieties.

6. But even within this clever variety each individual must begin at the beginning, and does not escape the mistakes common to the species. It cannot protect itself from them, for it does not know that through them its parents or relations have been injured; they kept their experiences to themselves.

7. No moth which has singed its wings has warned its offspring to avoid the flame; all insects are as stupid with the light to-day as they were a thousand years ago.

8. But, further, no gorilla or chimpanzee was ever clever enough to teach its progeny its life experiences and give them warning. It cannot be from lack of love and care for its young. Is not excessive love of offspring called 'monkey-love?' (*Affenliebe*).

9. Owing to this lack of transmitted experience, this individual acquirement of resource,

the whole animal world, even if it progress forwards in an unbroken chain from one generation to another, must develop much more slowly than the human species.

10. But a continuous unbroken development of the higher faculties among animals is unknown. Up to the present in the history of the earth, we meet only with more perfect species appearing by leaps. Therefore, the possibility of the use of experience is excluded; the missing links fail which might have shown the gradual progression towards perfection.

11. The feeling of 'I'—the Ego—is the recognition of its own personality, an indivisible whole in the living organism, a true individuality because *dividi non potest.*

12. This Ego feeling is conscious in man, unconscious in animals, absent in plants.

13. Nevertheless, plants are living beings, but their manner of life is different from that of animals.

14. The plant has no central nervous system; it has only functional organs—that is to say, such as serve the purposes of preservation and reproduction. It has no feelings, therefore no Ego.

15. The folding up of plants at a touch, as in the mimosa, may mislead us into thinking

that the plant feels. The individual plant, however, experiences no consciousness of the touch. Still, it may remain an open question whether the cells in the contracting part may not have feeling, and thus an Ego feeling be suggested by them (see also §§ 17-20, III.).

16. The actions which an animal does or leaves undone serve unconsciously to preserve its Ego.

17. The dog which springs at the throat of its master's assailant may regard that assailant as its own enemy, which inspires it to attack him for the preservation of its own Ego.

18. Or the dog attacks because it remembers the blows it received while it was being trained to protect its master, and seeks to save itself from a repetition of them.

19. If a hedgehog is attacked it rolls itself into a prickly ball to protect its Ego. If a worm is disturbed, it feigns death to protect its Ego.

20. The Ego feeling in a man says, *My* hand, *my* foot, *my* eye. It considers those members as belonging to itself—its Ego ; but all parts of the body severally and collectively do not form the Ego. They are not the essential Ego itself.

21. Let us suppose for a moment that all our senses, organs, and the members of our bodies

are severed from us, yet that something which can think remains. I see nothing, hear nothing, feel nothing, but, notwithstanding, *I* myself am still there!

VII

LIFE

1. SUPPOSE we imagine before us the whole world entirely inorganic, without living organisms, what remains but an enormous mass of dumb, blind, and senseless material?

2. Incapable of becoming more perfect, it would continue permanently the same; at the most, it might change in form, if heat or cold acted upon it.

3. Objectless and purposeless would be its condition, unless, perchance, 'Nature' might find pleasure in gloating over this mass of material as it presented itself, sometimes as a solid block, sometimes in waves which raged tempestuously or glided smoothly away, and again as an airy creature floating in the heights, as if Nature, like a child, should delight herself with the coloured stones and glittering crystals.

4. 'Nature!' What else is to be comprehended under this expression as the sum total

of all matter with its contained properties, together with the forces inherent in that matter?

5. If Haeckel ascribes to inorganic atoms feeling and effort, so Baumann* points out that the conclusion must inevitably be 'that double the mass of matter must have double the amount of spirit to what was contained in the original quantity.'

6. According to Haeckel, then, a piece of copper weighing two ounces must have double the amount of understanding and feeling to what a piece weighing only one ounce could have, a thousand hundredweights of copper must possess a thousandfold more soul than the latter, and if one stood at the top of a mountain veined with mighty metallic masses which contained thousands of tons of metal, how much spirit, feeling, endeavour one would have at one's feet!

7. Yet how remarkable it is that nothing in that colossal mass of intelligent and sentient atoms, piled one upon another, gives a sign of pain or pleasure!

8. How extraordinary that not the very slightest differentiation of spiritual capacity is manifested, whether copper or lead or iron or

* Häckel's 'Welträtsel,' Leipzig, 1900, p. 26, *et seq.*

tin be in the mountain, or whether the whole be composed of chalk or granite or marble! How strange that all, without exception, show to the human comprehension the same quantity and quality of spiritual capacity—namely, none at all! May not all this—*pace* Haeckel—be simply dumb, blind, dead rock?

9. Very rightly Baumann* calls Haeckel's attempt to prove that the atoms of matter and force are themselves spirit 'an arbitrary poem.'

10. Inorganic matter—metals, rocks, water, nitrogen, oxygen, etc. — only has value and importance as building material for the living organisms, and so far as it is useful and necessary for their growth, preservation, and propagation.

11. Matter is also of importance in so far as it serves the living organism in its efforts and desires after beauty. It provides the wherewithal to appreciate and enjoy art.

12. Without colour Raphael could not have represented his visions in all their wonderful beauty, although he might have seen them with his mind's eye; without marble the 'Venus de Medici' could never have been formed.

13. But it was not the colours upon the

* Häckel's 'Welträtsel,' Leipzig, 1900, p. 51, *et seq.*

palette which created the beauty of the Madonna, but Raphael's mind, and marble is nothing but dead carbonate of lime, out of which the sculptor creates an Apollo, the chemist soda-water.

14. Chemistry teaches concerning the individuality and combination of matter; the powers which may develop from them belong to the realms of physics, not of biology.

15. In a purely inorganic world the idea of Nature would be exhausted if one put it on the same basis as 'matter in its chemical and physical behaviour.'

16. Nor is this idea of Nature sufficient even for the organic world. Something further must still be added, which is neither matter itself, nor yet any chemical or physical property or force residing within matter.

17. It is that definite something which vitalizes matter, which transforms the inorganic into the organic, the living organism.

18. In the living organism it is innate; ruling chemical and physical properties, to make them useful.

19. The matter which takes part in building up the living organism — nitrogen, oxygen, hydrogen, sulphur, iron, etc., amongst others— is added to it by active assimilation. It takes

to itself the suitable material necessary, and either employs it in the bodily parts already available, or for the formation of others; the unsuitable and superfluous is rejected.

20. The living organism understands how to use the physical forces set free by these changes for its conservation (for instance, the production and regulation of heat), its growth, and its reproduction.

21. The moment that intimate union is loosed which bound matter to the something which vitalizes it, that moment matter again behaves in its chemical and physical action, just as any other inorganic matter of the same kind would do.

22. That *something* is life.

23. The answer to the questions what is life, where does it come from, where does it go to, is easily given thus: ????!

24. The most easily answered question is this, Where does life come from? The old aphorism, *Omne vivum e vivo* — all living things spring from living things—is proved to us daily—nay, hourly!

25. This aphorism expresses a rule without exception, and therefore of equal value to a natural law.

26. A natural law knows no exceptions.

27. What may be regarded as the result of a

natural law must always happen if the conditions are fulfilled under which it can happen.

28. A leaden ball thrown into the air falls again to the ground.

29. If out of millions of leaden balls thrown into the air only one at any time escaped from the earth's attraction, then gravity could no longer be considered a universal natural law acting upon all bodies.

30. The elements which compose the earth's globe are of an older date than the living organisms in or upon it.

31. As at that time the earth was still in a molten condition there could have been no living organism, whether of a recent or primeval species, in existence. But all matter was already there.

32. It was later on in the existence of the earth as a planet that the first living organism appeared upon it.

33. Whence came that vitalizing force which first caused matter to become a living organism?

34. Some have imagined that the first germ of life may have come to this earth from some other star as a meteor.

35. Then the question would arise, Where did the matter of that other star obtain the life

principle which produced its first living organism? And no real explanation is given by this possibility.

36. The investigation as to what life *is*, is advanced, when one thinks of it, by the consideration of what life is *not*.

37. Life does not consist of either copper, lead, gold, tin, or any other metal. It is not composed of either sulphur, iodine, chlorine, nitrogen, nor any other metalloid. Life is neither an acid, nor a base, nor a salt. These bodies compose the earth; but of none of them, whether as a solid, fluid, or gas, is life formed.

38 *D.* That life cannot be formed out of any element in the earth whatever is clear from this point as well—matter can be weighed and measured, life cannot.

An animal which is just dead does not take up any less space than it did while alive, nor does it weigh less than before.

P. The last statement, at any rate, is correct. But room might have been found in one of the internal organs, say the brain, for the *vital spark*, without its requiring greater space for the organ or for the whole individual.

D. How is that comprehensible?

P. We need only imagine that life, as it were, nestles in a cell, compressing its other contents,

and so holding it in a state of tension. So soon as it vanishes the other contents of the cell expand, owing to the decrease of pressure, and fill up the space which the vital spark had occupied.

We do, however, know of a substance which cannot be weighed, and whose presence does not prevent the space it occupies from being occupied at the same time by other substances.

D. You mean ether, which fills universal space and pervades all earthly materials.

P. Let us consider whether life could not consist of ether or some substance similar to ether.

D. But we must not forget that ether is a hypothetical—that is, a supposititious—substance, whose existence is taken for granted, but cannot be proved like that of a piece of metal. We *believe* that it exists.

P. And that because so many weighty natural appearances and processes can be naturally, not artificially, explained if it exists. We are justified in considering it to be present, in fact—at least so long as some other theory concerning the action and behaviour of light, electricity, and heat does not arise which makes the etheric theory less worthy of belief.

D. If life consists of ether, it must possess

the qualities and properties which we attribute to ether. Let us see if this be so.

39. In physical science we have come to the root idea, which Wundt expresses as follows: 'All that the unconscious experience recognises is to be admitted as a fact, so long as it is not demonstrated by discrepancies to be a mere appearance due to them. No data of experience may be negatived without reason.'*

40. Experience shows differences between a corpse and a living being which are known to everyone.

41. It is perfectly obvious that in the corpse something is missing which the living body possessed.

42. This (missing) something cannot be disproved by simple denial, as discrepancies would follow.

43. The hypothesis that this something may be matter cannot be thrown aside as against reason with no more ado, by those who look upon the hypothesis of luminiferous ether as settled.

44. Just as the existence of the luminiferous ether is maintained, because everything behaves as though it did exist, and because the hypothesis is convenient for the elucidation of physical

* Baumann, Häckel's 'Welträtsel,' Leipzig, 1900, p. 20, line 28.

phenomena, so the existence of the life ether is maintained, because in this case also (in the living organism) everything behaves as though it did exist, and because this hypothesis is convenient for the elucidation of biological phenomena.

45. As no experience contradicts it, it may be allowed that those elemental properties which are recognised in luminiferous ether must also be adopted for the life ether.

46. So it can be asserted of life ether, as of luminiferous ether, that it is invisible, that it cannot be weighed or handled. Life ether is so attenuated that just as the luminiferous ether penetrates between the molecules and atoms of inorganic matter, so life ether can find a place between those of the organic mother cell. Its action, just as in the case of luminiferous ether, can only be manifested through the medium of coarser matter.

47. Luminiferous ether is made manifest by its calling forth physical and chemical effects in matter, such as light, colour, electricity, and so on. Life ether is made manifest by calling forth in matter signs of life, such as the formation of organs, assimilation, growth, propagation, and so forth.

48. The luminiferous ether works in parallel

lines with the life ether, and for it, even in organic matter; a part of the needed vibrating luminiferous ether falls upon the eye. This vibration sets up through the rods and cones of the retina a sensation which, transmitted by the optic nerves to the life ether, is felt by it as light.

49. The life ether also exercises its influence upon the inorganic matter which comes within its sphere. It builds through the transformation of organic matter, and that which it cannot use it ejects or endeavours to render harmless —*e.g.*, the encapsuling of foreign bodies.

50. The physico-chemical action attributed to the luminiferous ether upon matter may at any time be demonstrated by suitable apparatus. It may be changed into light, heat, electric or chemical activity; for instance, a colourless solution of nitrate of silver is turned black by sunlight.

51. The result of the action attributed to the life ether upon biological material cannot be demonstrated by any apparatus. We have never seen a previously non-living organism gain life (of course, an ovum containing seed must be considered as already living), nor a previously dead organism come to life.

52. The life ether combines with matter in the *stadio nascendi* of the living organism

only at that moment when a new living organism is formed either from one or two other living organisms.

53. The weight of the universal or luminiferous ether, or, what is the same thing, the action of the earth's gravity upon it, is considered to be negligible ; it cannot be weighed.

54. It is also invisible—it cannot be handled. Its vibrations only make themselves perceptible as light, colour, heat, etc., when they impinge upon a denser material.

55. The interstellar space, which is continuously flooded with rays from innumerable glowing suns, is dark and cold.

56. In imagining the existence of luminiferous ether at all, its divisibility must be considered at the same time.

57. The light which at this moment falls upon my paper from my lamp cannot be the same as that which, as rays of sunlight, at the same moment gilds the roof of the Capitol at Washington.

58. If a destructive flash of lightning from the heavens is composed of the same material as the harmless spark of a small induction coil, then the difference between them can only lie in the quantity of ether which is brought into play.

59. The same remark applies to the sun-rays, whether thin as a hair or thick as your arm, in respect to light-power, warming, and chemical action.

60. The question as to *how much* luminiferous ether goes to the formation of a ray of sunlight a millimetre thick can just as little be answered as the other question—how much of the life ether is required to cause a certain organism to live.

61. The living organism consists of certain definite inorganic matter organized in a definite manner in a definite structure which the life ether is impelled to join.

62. If that structure is destroyed or altered up to a certain point, then the action of the life ether ceases to manifest itself, the living organism is dead.

63. With the death of the living organism there occurs the separation of the life ether from its tangible and measurable parts.

64. The life ether is like the cosmic ether, like all other matter, together with their innate forces, indestructible, therefore immortal.

65. If I blow out the lamp which illuminates this paper, it becomes dark; the vibrations of the ether which were called forth by the oxidization of the material burnt in the lamp ceases.

But the ether itself does not cease, although there is nothing at hand to prove the fact. That which formed the light is not dead; to a certain extent it sleeps till a fresh impulse causes it to awake.

66. That which is to be recognised as 'the eternal iron laws of Nature' must have the same signification in the organic as in the inorganic world.

67. The organic, in the strictest sense of the term, is that which transforms the inorganic material into the living organism—the life ether.

68. It is indubitable that the material bound together in the living organism is in a different relation to natural forces than simple raw material.

69. The living organism assimilates Nature's raw material; *in itself it represents a natural force.*

70. No piece of metal (or salt, or any inorganic substance whatever) can ever assimilate to itself another metal or salt—that is to say, it cannot incorporate it so as to make it an essential part of itself.

71. We may smelt copper and gold into one ball, but no one would maintain that in such a ball the copper had assimilated the gold or *vice versa.*

72. The leg of a newly born child differs only from a full-grown man's as to quantity, not as to quality.

73. The raw material needed to transform the suckling's leg into a man's leg, the growing child assimilated to itself from the raw or partially manufactured materials of Nature, which, whatever else they were before, were certainly not a man's leg.

74. In the ball we spoke of, gold particles and copper particles could only have been smelted into intimate relationship; the particles remain unalterably gold or copper.

75. A living organism cannot assimilate another living organism without one of the two ceasing to exist as an individual.

76. A tiger to whom Nature presents other living animals as partly manufactured material, which may be used for its preservation, can only fulfil the command to assimilate by devouring those animals.

77. There is no essential difference when one plant fastens upon another, asphyxiates it, and, like the tiger, assimilates the material yielded by its victim.

78. Organisms living as parasites on or in other living organisms—as plants on or in plants or animals, or as animals on or in other

animals or plants—do not become assimilated; they are tolerated or killed.

79. The moment a living organism (or part of it, as when a limb mortifies) ceases to be a living organism, its existence and power of assimilation fail; it disintegrates into raw material and becomes subject to natural laws as before when the life ether is separated from it.

80. We see a fly-wheel remains in motion for some time after the motive power which drove it is cut off; the material was set spinning round, and only by degrees does its weight bring it to a standstill. It is in this way that after the death of an animal certain appearances of life may continue for a time—for instance, the heart may continue to beat.

81. The growing of hair after the death of an individual indicates that the hair-cells may still possess some of the characteristics of plants (see III., 21).

APPENDIX TO SECTION VII

1. Everyday experience shows that the conditions of life are determined by the persistence with which the cell structure of organic tissue remains intact.

2. From structure alone, the simple gather-

ing together of dead matter, neither life nor feeling can arise.

3. The structure is the instrument which the living principle uses for its activity.

So a musician makes use of a piano in order to make himself heard as a pianist.

4. Even the greatest pianist, if given an imperfect instrument, can only produce imperfect effects.

5. The living principle moulds the organs to its use, not the reverse: dead matter is made into organs.

6. If that which vivifies the structure is a material—the life ether—then it is permissible to suppose that, like the cosmic ether, it exists independently of all other matter.

7. It is possible to imagine that beings composed of the simple life ether could exist in the burning rays of suns or upon the icy mountains of worlds without atmosphere—yea, even in the cosmic ether itself.

8. What qualities such etheric beings should have to enable them to ride upon the light rays, belongs to the region of phantasy.

9. Immaterial living organisms are nowhere to be found upon the earth.

10. If spiritists state the contrary, it is for them to produce definite proofs, which will stand

every test, that such beings do exist. This it has not yet been possible for them to do.

11. Against the reality of the ghosts cited by the spiritists may be mentioned the senseless actions by which they manifest their supposed presence.

12. One notes the meaningless, childish behaviour of the so-called spirits, whose intellect is satisfied by throwing about kitchen pans or other articles in use, and such idiotic proceedings. Samuel's ghost, when summoned by the Witch of Endor, at least behaved reasonably.

13. And if it should be said that during their lifetime on earth these spirits were of a low type—rowdy fellows—whose progress consists in this, that they may now in the astral body frighten people with harmless jokes, still, it is very curious that it should be just these fools of whom we receive reports, never of an earnest ghost with whom we could exchange an intelligent sentence.

14. Or we might imagine that all the life ether is used for the vitalizing of living organisms in existence, and that a new organism could only arise by the required amount of the life ether being set free on the death of a previous organism.

15. It is said to have been observed that

after a war entailing great losses, the population has increased in a far more rapid ratio than in normal times, although it was the strong young men that war destroyed.

16. Let us suppose that a great man—say Goethe—dies.

That which made Goethe was not the material of which his body, living or dead, was formed, but his life ether. At the moment of Goethe's death every creature is already filled with the life ether; but just at that instant a mouse is conceived, and Goethe, perceiving this, and rejoicing not to be forced out into the void, enters the embryo mouse, and so Goethe becomes a mouse, and as such creeps in and out of the holes until a cook poisons him or a cat eats him. Then his life ether is set free again, and must in that moment content itself with a residence in a tortoise just at the point of formation. And, during his present existence, Goethe's whole pleasure is that here also he meets with the intermaxillary bone which he discovered in the year 1786.*

17. The teaching of the transmigration of souls in the sense in which it was held by the ancient Egyptians can only be held to have sprung from childish fancies.

* An osteological discovery of Goethe's.—THE TRANSLATOR.

The progressive development of all living organisms from the lower to the higher is acknowledged to be a natural law.

VIII

HAECKEL'S MORAL NATURAL LAWS

1. It will not do to say, as Haeckel does,* that the eternal basic natural laws apply, not only to the inorganic, but also to the organic and moral worlds.

2. Natural laws are eternal, basic—all that this can express, unchangeable, the same for all time—or they do not exist at all. The quality which marks the eternal, unchangeable law is likewise the character of a natural law.

3. Ethical monism, according to Haeckel, shows that the sense of duty in man rests upon the basis of social instincts which we find in all the higher animals which live in families.†

4. The social instincts of animals living in families may be fixed by an eternal, unchangeable, natural law. But the history of the development of man's customs happily teaches us how different and changeable man's sense of duty and social instincts have always been, and

* 'Riddle of the Universe.' † *Ibid.*

the experience of the present day shows them to be so still.

5. Happily! For without this changeability progress in man's habits and social relationships would have been impossible; the inexorable immutability of a natural law would have confined mankind for ever within the restricted sense of duty springing from the earliest social instincts, unformed, with neither perception of Nature nor the training of science and art.

6. What things have happened in times past, and still do happen daily, owing to the social instincts and consequent sense of duty!

7. Upon social instincts were based the feelings of duty which gave rise to acts of barbarity upon vanquished foes surpassing the cruellest instincts of wild animals.

8. The sense of duty resting upon the social instincts caused not only those who acted, but even those who thought, differently to the populace (or majority), to be stoned, crucified, burned.

9. When the Romans fed fish with human flesh in order to impart to them a finer flavour, it was not against their feeling of duty based upon social instinct.

10. We read in the chronicles of the Middle Ages that the judge who sat at table in the midst of his family was filled with self-conscious

joy of pious duty performed when by dint of the most fearful tortures he had extracted a confession from an old witch. Red, inflamed eyes had thrown suspicion on the unhappy woman. But what did the judge know of *conjunctivitis chronica?* There he stood, amid hallelujahs and hosannas, beside her funeral pyre, proud of having rid society of such a pest.

11. What is that word the very sound of which to us in the twentieth century bears so dreadful an import? *Auto-da-fé*, an act of faith ; therefore a religious act, an action of the highest duty and morality.

12. Of a truth this moral act was often enough misused from far other than religious motives, as in France for the overthrow of the nobility and the enriching of the Sovereign's treasury. As a matter of fact the lowest motives and passions found satisfaction by this easy path —covetousness, envy, hatred, revenge ; truly of the 8,800 human beings sent to the flames at the hands of Torquemada in the years 1485-1498 ; of the 31,912 unhappy victims who, according to Llorente's statement, were burnt alive in Spain alone, the great majority were handed over to the Inquisition by barefaced scoundrels from quite other motives than religious zeal.

13. But about this we must be quite clear.

It was not always a lust of murder, but often a feeling of moral duty which inspired the Torquemadas and compelled them to carry out the *auto-da-fé*, although the present generation gives quite another value to the word 'moral.'

It was not simply brutal lust for death and terrible suffering which filled the great ones of the earth as they encircled the glowing funeral pile in all the pomp and panoply of their power with psalms on their lips. They were inspired by the glorious consciousness that their presence incited others to good works and high morals.

14. The *auto-da-fé* must have been regarded as a moral duty, not only by the instincts of the Inquisitors, the priests, but also by the princes and the people, in those lands referred to.

Just imagine if in those times an edict had gone forth in Spain that the drinking of wine was to be considered from that date a crime worthy of death; the funeral pile which the first victim had to ascend would have wrapped in flames the palaces and churches, and their rulers with them.

15. A heretic, a witch, was *the* lie, *the* hideous, *the* wicked to the social feeling, not only of the priests, but also of the princes and the people, and on this account must be got rid of—a feeling of duty resting 'on the basis of social instinct.'

16. So to them the *auto-da-fé* was a cult of the good, the beautiful, and the true—just what Haeckel* expresses as the godlike constituent of the monist religion.

17. We should certainly not have progressed more favourably if the social instinct and feeling of duty had been based upon an absolutely unchangeable natural law like the law of the freezing-point of water.

18. Good, true, beautiful, are relative ideas which convey an entirely different meaning at different periods. Nowadays mankind understands these terms quite differently from a thousand or many thousand years ago. And after a thousand years, or many thousands, or, perchance, to-morrow, fresh changes of view may take place, and so with the ideas and objects of the cult of the monist religion.

19. Or are we to suppose that an eternal basic natural law in the moral world has power in one part of the earth and not in another?

In England, for instance, there can be no eternal basic natural law which does not rule in Germany as well—not even one referring to morals. And?

20. And indeed! In England a man who married his deceased wife's sister would be con-

* 'Riddle of the Universe.'

sidered as 'not in society,' immoral, not a gentleman, to be avoided by respectable people. In Germany, on the other hand, such a marriage is regarded as the reverse of derogatory; rather to the social instincts of the German does it appeal as praiseworthy that a man should by marriage with his sister-in-law from a sense of duty bring home the nearest relation to take charge of the dead mother's children. From her might be expected more tender love and care for the orphan children than could be demanded where 'schaltet die Fremde liebeleer.'*

21. Haeckel may know all this as well or better than we, and will, perhaps, think we misunderstand him. Not to him are these reflections addressed, but to such as accept without question the authority of this remarkable man, believing in him blindly, and understanding—or misunderstanding—him as we do.

22. Be this as it may, 'eternal iron natural laws' for the moral world do not exist. All experience speaks against them; no one dare interpret them in such a sense, not even to favour the monist doctrine.

* 'Die Glocke,' Schiller.

IX

OTHER HAECKELIANA AND COGNATE SUBJECTS

1. WHEN Haeckel says, 'The best we can aspire to after a useful and most conscientiously spent life is the eternal peace of the grave,'* we would suggest that that is a matter of taste.

My wishes—and probably the wishes of many others—would be better satisfied by living again another useful, good, possibly even a more useful and better, life, rather than the simple, eternal peace of the grave, the meaningless silence of eternal death.

2. 'That which man calls the soul is, in truth, a natural appearance.† The law of the conservation of energy, the retention of force (Robert Mayer, Helmholtz), states: 'Every natural force can be transmuted, directly or indirectly, into any other natural force.

3. Natural force is that force which is indissolubly bound up with matter—is, indeed, essential to its existence.

4. Nature's appearances are the expression of those forces.

5. The forces of Nature manifest themselves

* 'Riddle of the Universe.' † *Ibid.*

differently according to the kind of matter and the action of one kind of matter upon another.

6. The action under like conditions always takes place in the same way; therefore we speak of a 'natural law.'

7. The power emanating from matter, the force of Nature, can express itself as movement, heat, light, electricity, etc.—that is to say, become natural phenomena.

8. Experience proves that movement, heat, light, electricity, are interchangeable.

9. Now, according to Haeckel, the soul is a natural phenomenon, the simple expression of natural force emanating from matter, as do heat or movement; therefore it follows that, as any force of Nature can be changed into any other (can, indeed, only be known by the phenomena which occur and by their reaction on one another), so light, heat, movement, may be changed into thought, emotion, and will, and *vice versa*. But this is contrary to all experience.

10. Therefore, Haeckel is not scientifically justified in calling the soul a natural phenomenon.

11. According to Haeckel, if one believes at all in anything Godlike, the most reasonable belief is to imagine a good God and an evil God. Now, this is certainly not the most

reasonable, though we may say that it is the easiest explanation for a childlike comprehension; therefore, in all people still in the earliest stages of culture we find a belief in good gods and spirits and evil demons.

12. The simple ideas of these people, who on every side met with events which were beyond their control, at once attributed them to one or more beings higher than themselves.

13. Sometimes good and beneficent events befell the individual or community, such as plentiful harvests, the blessing of children, increase of cattle, and so on; sometimes evil and apparently malevolent droughts, plague in man and beast, floods or earthquakes.

14. The simple minds of these early peoples ascribed the pleasant events to the action of good spirits, while the evil spirits (demons) were made responsible for the grievous; the good was caused by a good God, the misery by an evil demon.

15. To attribute to one God everything good and bad does not indicate a simple idea, but is rather the standpoint of an advanced culture which is based upon and uses a bygone civilization.

16. 'Good' and 'evil' are relative terms: 'To the one an owl, to the other a nightingale;

to the one death, to the other bread.' That which was a misfortune to one was often enough a blessing to the other; and therefore, while the first regarded the author of an event as an evil demon, the second would consider him a good God. As with the individual, so with the family, the tribe, or the whole nation.

17. More reasonable is the conception of an advanced culture which attributes to one God both good and evil than the acceptance of the idea of two godheads, a good and an evil, continuously striving against each other, and good or evil meted out to mankind as the one or the other prevails.

And so mankind receives good at His hands when He is satisfied, evil when He is displeased.

18. The most reasonable conception, and that worthy of the highest state of culture, is that of one God, all of whose works, despite all the obvious evil in the world, are good.

19. This conception was revealed to a few favoured individuals (natures) in ancient times as an absolute truth. By them it was imparted to their families, their tribes, and at last their nations.

20. Perhaps those favoured natures attained to their idea of the Godhead as a single, abso-

lutely good Being, through their own reflection and meditation. Perhaps during their reflection and meditation this recognition came as a flash of lightning into their souls, suddenly illuminating the dark night of the riddles and contradictions of the world, explaining all, reconciling all.

21. Then, when they were almost blinded with amazement by the sudden stream of light which, following the flash of knowledge, revealed to them the ALL, there arose in their souls the joyful cry, 'It must be so, it *is* so!' and, their enfranchised senses satisfied, must have been almost stunned, dazed.

22. It is, perhaps, more in accordance with the Eternal Spirit to reveal such knowledge by inspiration, rather than to declare the revelation by the voice and language of mortal man with the command to accept it.

23. Even investigation of Nature can hardly lead to any other conclusion than that there is only *one* Principle which governs the world.

24. Far from being the most reasonable conclusion, or that most in consonance with science (as in Haeckel's opinion), that there is one good and one evil God, it would in the sense of natural law be the most absurd.

25. Should we maintain, then, in natural science the view that the evil God has created

the malarial plasmodium, and that the good God immediately started manufacturing a fever preventive in the form of the bark of the cinchona-tree?

26. It will not do to hold that there are good and evil natural laws; there are only necessary ones.

27. Von Humboldt called volcanoes the safety-valves of the earth. A safety-valve may be choked up. The consequence in a boiler is an explosion, in the earth an earthquake.

28. By means of an explosion in a volcano the necessary adjustment of pressure in the interior of the earth is restored.

29. According to physical laws, a sudden release of tension is conjoined to a blow which is projected at its surroundings; therefore an earthquake is the natural result of a necessary process of Nature.

30. Is such a natural process morally good or evil? Is Nature to put her necessary laws out of gear because one man has built his house upon volcanic ground, or even because many men have built a town? Where, then, would be the regulation of the whole?

31. Deluges have at times flooded large districts of the earth, drowning all living things. Spring floods have destroyed whole valleys and

torn down all in their course. Were these phenomena of Nature morally good or evil? Were they not rather the necessary consequence of the forces of Nature working according to natural laws upon the earth?

32. Should or could the forces of Nature arbitrarily stay their course in order to prevent the usual consequences, because many valuable lives must be sacrificed by those who, either not knowing or ignoring the danger, have selected just those places for occupation?

33. Could other natural results follow according to law, even when it was *not*, as we may imagine, in the Creator's plan (or shall we say Nature's plan?) to render the conditions of life more advantageous for the later races of mankind by the fluid and fiery convulsions of the crust of the earth?

34. Is there anything in the world more reliable than the unbreakable, never-failing natural forces?

35. But they care nothing for good or evil, they are neither moral nor immoral. If a rope ladder is well knotted together it will bear the weight of a murderer not less safely than that of the father who wishes to rescue his child from a burning house. If the weight of the climber is greater than the ladder can support,

then it breaks, whether it bears a criminal or a hero.

36. If the little ship is well built of sound material and well steered, it scorns the storms and waves, and uses both; forces of Nature hold it together, forces of Nature carry it, forces of Nature guide it into the harbour. The same forces of Nature would destroy it were it less well built, less solid, or badly steered, and it would go to the bottom.

37. The forces of Nature fulfil their respective destinies: they do not alter because their action is foreseen and turned to account in the calculations of man.

38. They do not change even when imprudence, ignorance, malignity, or avarice send forth an unseaworthy ship to bid defiance to them.

39. *D.* The forces of Nature act in conformity to natural laws. They are neither good nor bad in a moral sense, they are necessary; the force of gravity, light, heat, electricity, motion, cohesion, adhesion, etc.—in short, all the forces of the organic and inorganic world—are neither benevolent nor malicious.

But is it not in accordance with the human mind to suppose a lawgiver when one is dealing with laws?

P. Certainly. Indeed, even Haeckel does not say 'good or evil natural laws,' but that a good and an evil god would be most reasonable according to experience. Although many are ready enough to say, 'The natural laws exist, have always existed—no one need have made them!' yet we cannot but think that this is a view which is forced upon man's comprehension. However incomprehensible the lawgiver may seem to be, it is much more incomprehensible to postulate self-made laws.

To an unprejudiced mind it will appear more probable that there is an intelligence which is the Author of the laws, and according to which he observes what events occur in the world. And only a thinker who is influenced by a school of thought, philosophic or otherwise, will perceive a certain self-government in abstract axioms and laws.

It is comprehensible that in the childhood of mankind the forces of Nature themselves, which were to be seen at work differently and often enough in opposition to each other, should be personified and worshipped as gods of light, water, fire, wind, etc.

Later, when mankind realized that these forces of Nature do not act arbitrarily, but are bound by laws, not to be able or willing to

conclude, according to the necessity of the cause required to satisfy our intelligence (Haeckel), that the existence of a lawgiver must be self-evident; would not be in the least according to a childlike point of view (called by Wundt the 'naïve experience'). But it would agree with an incomprehensible, totally arbitrary perception of Nature, requiring no support from experience. Therefore it would not be—as it might appear—a more advanced, but rather a less intelligent, view of Nature.

D. Let us leave those who are never satisfied when they meet with a law in ordinary life without seeking its author, but who, when dealing with natural science, are quite content to regard laws as self-made. Those whose understanding stops short at the recognition of a natural law without inquiring as to its cause must be left to their belief that laws make themselves.

If, then, we admit one or more authors of the laws, must not he or they be answerable for all that happens in the world in consequence of those laws? Is not this the real meaning of Haeckel's words?

P. Doubtless; and from this, again, it follows that the most reasonable view to hold is not that of a good and an evil God. For there are

neither good nor evil natural laws; therefore, as there is no moral difference between them, so we cannot attribute their origin partly to a good and partly to an evil God. Else must we conclude that the two inimical gods combined in friendship to create the world, and agreed which laws should act, the good or the evil, upon the creatures made by the two gods, especially upon man. According, then, to which of the two gods was the most cunning at the determination of the world's functioning, so good or evil predominates in the statutes governing the world.

D. Your irony is fully justified; such an unworthy view of the subject, like the childish ideas of the heathen, is far removed from that of Haeckel and other great thinkers. To take one highest Intelligence as the Originator both of natural laws and of all that exists is in accordance with our reason, which demands a Cause. The conclusion, then, is that the All-knowing could see beforehand that at the spot on which the people of Lisbon were to found their town a tremendous earthquake would occur at a given time. Would it not have been quite easy, and well within the bounds of natural laws, for the Almighty so to influence the founders of Lizabon that they should not build their city on that

particular spot, and so prevent 60,000 men from meeting with a miserable end there? And if the Almighty could do this, was He not bound to do so if He were likewise the All-merciful?

P. Those terrible natural phenomena, such as earthquakes, deluges, famines, pestilences, and all fearful catastrophes to masses of men, which in the course of ages have visited the dwellers upon this earth, in order to be comprehensible, must be considered from the same point of view as the bodily and mental, great and small, real and imaginary, sorrows and mishaps which befall the individual in everyday life.

D. From what point of view?

P. From the very highest, and always with an eye upon the whole. And so let the fearful sufferings, death, and bitter need occurring to the innocent be understood as moral processes —that is to say, bring them into focus with the eternal laws of the Almighty and All-merciful; as soon as we understand this life to be but a passing phase in our existence, whose end may lead us to a more perfect state hereafter.

40. Schiller, Byron, Mozart, Mendelssohn, Schubert, Raphael Sanzio, and many another eminent soul, died young. The bodily instrument which had been placed at the disposal of their genius was exhausted.

41. *D.* Is it a merit to have either genius or talent? One spirit receives for use in its path of life an organ, another an accordion. In this they are without either merit or blame. And so all is due to the grace of the Almighty?

P. Grace supposes inclemency, which cannot be attributed to the All-gracious. Possibly one soul is given an organ because in a former life it had already progressed so far as a flute, while the other souls had only got as far as a triangle. You take my meaning? Why gracious? Why not perhaps a reward for the efforts and merits of a former existence, for sorrows which the individual must endure on behalf of the race, and which have acted in the development of his soul. And is the Almighty less gracious if He does not suffer arbitrary proceedings in His creation, but rather directs all events in natural sequence and 'veils Himself in eternal laws'?

X

IMMORTALITY

1. In the first creature there must have been something immortal, which his descendants retain to the present day.

2. Every living man is the child of a former man; he, again, was the descendant of a previous sire, and so his forbears in an *unbroken* chain back to the first human pair.

3. This first pair *need* not have been a single pair; there may have been several pairs, who appeared either simultaneously or one after the other on the earth.

4. There would then have been, not one Adam and one Eve, but several, possibly in various parts of the earth, each representing an ancestral father and an ancestral mother.

5. The first human pair formed from its germ-cells descendants who had the germ-cells, not only for the next generation, but for all generations up to the present time.

6. The germ-cell whose development is represented by a man to-day must likewise have been contained in the first man. From an Adam germ-cell a Cain was produced, and at the same time he received from Adam germ-cells for his life. One of these Cain-Adam germ-cells developed into Cain's son plus germ-cells; one of these Cain-Adam germ-cells became Cain's grandson plus germ-cells, and so forth. And thus every man was potentially present in the first man.

7. The first man was mortal, but there must

have been something immortal in him, which something attached itself to his germ-cells and enabled them to preserve their life from generation to generation.

8. This possibility would become an actuality if brought into the environment needful for the development of the life principle of an individual.

9. The germ-cells which did not reach the womb, or which did not find there the necessary conditions for their development, withered, their life ether returning to Nature.

10. Just as in each man there is a vital something of his ancestors, so must there be in each animal, each plant, something of its ancestors, the peculiar germs pertaining to that animal or plant.

11. All animals and vegetables are the descendants of forerunners in an unbroken chain back to the original animal or plant, according to its genus.

12. Those germ-cells which, owing to circumstances, do not become animals or plants, wither and give their animal or vegetable life ether back to Nature for other purposes, just as they give up their inorganic matter, which the life ether had collected to form the whole organism.

13. Since we have not yet scientifically discovered the methods of the immortality of that which thinks and feels in man, the school of materialists makes short work of it and denies it out of hand.

14. 'How should a man be just with God?' asks Job. How shall a man be unjust with himself? we may ask the materialist.

15. If it appears permissible to the materialist and monist to ascribe an equal value to a stone of the field, a rusty nail, a bit of dirt from the street, and a thinking, sentient being, can he push arbitrariness to such a point as to declare himself of less value?

16. Does he not declare himself to be a less worthy part of creation when he proclaims the constituents of a clod of earth to be immortal, and rightly immortal, but the essential part of himself to be perishable?

17. Is, then, a dead materialist or monist the same as a living one? Is there not lacking in the dead materialist precisely that essential which, in life, made him the admired materialist or monist?

18. A dead materialist weighing 140 pounds can have no more natural substance than a dead idealist of the same weight. But is not the leanest living monist a much cleverer fellow, a

far more perfect constituent of Nature, than the fattest corpse of a non-monist?

Can anyone be offended if we suppose that he who cannot see this will not?

19. Can we shut our eyes to the fact that every living being has a something *plus* a corpse, and that this *plus* is just that which makes it into a living being?

It is, what it is, but it exists!

20. And it is just this plus which, in the opinion of the materialist, Nature holds to be of least value of all her possessions—far less value than even a clod of earth.

21. Of so little value that to it alone was allotted by Nature only a momentary existence. To all else she gave an everlasting continuance.

22. Without scruple the materialist tears a rent in the web of the eternal natural laws and decrees one exception: alone of all things in the world the life principle shall be mortal!

23. It is a thousand pities! This charge kills exactly the most beautiful, the most valuable, of all the good things Nature has known how to produce.

24. Whether you will have it so or not, O monist, you are in fact a something far more important and more precious than a bit of

quartz. Also Nature has given herself far more trouble over you in so endowing you that you could become so much more wonderful a creation than a simple bit of quartz.

25. But Nature cannot make an exception to her laws for the sake either of yourself or your doctrines, Master Materialist, and therefore you remain immortal whether you desire it or no.

26. The *plus* in your physical body—that part of you which thinks and feels—Nature must by her own laws carry forward into eternity as all that pertains to her—as indestructible as the essentials of your corpse in the future, or as the quartz crystal which perhaps you once swallowed, and which may be leading a darkened existence in your colon.

27. Nature can make no exception because you in your wisdom and I in my simplicity do not know how to say what Master Materialist looks like when he has shuffled off this mortal coil ; but whatever or wherever he is, that he was before.

28. A sentence of Goethe's may close this chapter: 'I have the firm conviction that our spirit is a being of absolutely indestructible nature ; it is perpetuated by working from eternity to eternity ; it is like the sun, which to our

earthly eyes seems to sink below the horizon, but which in reality never sets, but shines forth continuously.'*

XI

PERFECTION (1)

1. NOTHING in the world has been, or is, perfect; but everything is becoming more perfect.

2. With the increase of his knowledge of Nature, man is ever more and more able to utilize all inorganic and organic materials in Nature, and to direct their powers so that they may harm him less or not at all.

3. This power to direct is the cash payment which Nature yields to the searcher, in that it shows how one force of Nature either works against another or together with another, and how to master the opposing force or combine with it and make them all of use to us.

4. Mankind was given understanding—an instrument for gaining knowledge, not knowledge itself. The keynote of mankind, then, sounds not only 'live,' but also 'strive.'

5. Not a simple enjoyment of existence,

* Von Eckermann, 'Gespräche mit Goethe.'

which would have no essential advantage over 'the everlasting peace of the grave,'* lay in the call to action which produced mankind, but that they must themselves procure the most perfect conditions for their standard of life.

6. For this purpose the Creator lent them the weapon of understanding, and placed them under conditions of incessant stress with the austere fellow-travellers—necessity, pain, sickness, and death.

7. Necessity, pain, sickness, death, are also the companions of animal life.

8. Instinct is a gift of Nature to the animals, and consists of knowledge greater or less, but always limited, restricted, yet complete.

9. Nature gave instinct to the animals that they might protect themselves from their oppressors.

10. The moth's treasure of knowledge (instinct) is smaller than that of the fly, who avoids the flame.

11. The instinct of a given species of animal is not capable of becoming more perfect. The treasure of knowledge possessed by an individual animal, represented by its instinct, cannot be increased, but it can be diminished.

12. When certain animals whose instinct

* Haeckel, *loc. cit.*

teaches them that man is their conquering enemy get used to his presence, and do not flee from him, this represents a diminution of their instinct, which often enough proves fatal to them.

13. The prairie buffalo, in the undiminished possession of its instinct, does not willingly permit the butcher to approach it, as his degenerate cousin, the tame ox in the stall, does.

14. The human mind does not bring any available knowledge with it when it begins life's journey, but it brings the faculty of gaining very wide, perhaps unlimited, knowledge.

15. An animal's instinct, then, can show itself to be superior to man's mind upon a certain grade—that is, when the man's progressive knowledge has not yet reached the point of the animal's complete knowledge as received from Nature.

16. For instance, a fly will avoid the flame of a candle, which a child will grasp, and so burn himself. Or, again, an animal will recognise a plant as poisonous, which the primitive man only learnt by degrees from the suffering caused by consuming it.

17. But instinct remains *in statu quo;* it stops short at avoiding poisonous berries. The mind of man, owing to the harm received,

becomes not merely wise, but wiser, and discovers in the poisonous berry a therapeutic agent to be used for his diseased eye—*e.g.*, belladonna.

18. And even though it could be proved that man and animal had everything in common, even if the difference between animal instinct and human mind were purely quantitative, still this difference is fundamental.

19. A flea which is much chased may by much jumping learn to jump further than another flea, but it will never think otherwise than as a flea.

20. In the enormous, perhaps unbounded, capacity for perfection of knowledge lies a manifest fundamental difference between mankind and animals.

21. But it is quite beyond calculation how far man is able to progress in this growth towards perfection. No one can say if, or how far, it may be successful in banishing from the world sickness and evil affecting individual and social life, even perhaps natural death, which Metchnikoff, the naturalist (*cf.* V. 13), is inclined to regard as not a necessary law of Nature, from his experience with certain bacteria.

22. But even death itself cannot lead to anything retrograde, because death is an

arrangement of Nature, and Nature knows no retrogression.

23. Where, then, does the action of an 'evil' God* come in, whether a single individual dies or 10,000 at once, as in earthquake, deluge, or epidemic?

24. If time has no end—and it has none; if nothing can perish—and nothing can, the life ether just as little as the luminiferous ether or gross matter; if all living organisms progress in perfection—and all do so, plants and animals appearing by bounds as higher species—then is death but a step for the living organism to a higher grade of being—up the Jacob's ladder towards perfection.

D. According to this doctrine, suicide would be a laudable action, and each should make an end of his life as soon as possible, in order that he might reach a higher stage of existence the more quickly, and parents could do their children no better service than to smother them as soon as they were born. Then, indeed, all sorrow would soon cease, and the rest could be awaited with patience.

P. You can see for yourself that that is not my meaning. It does not at all follow that the death of a living organism must of necessity

* Haeckel.

lead to a higher state of existence every time, only that death is necessary to progress.

D. Could such an opinion be based upon any natural process?

P. Yes, our knowledge of the animal kingdom, which tells us that their highest species, as is to be seen in the rock formations of the earth, only appeared when the lower forms became extinct. But before these higher species appeared the lower forms had lived for innumerable generations, and innumerable generations of them had died.

D. So you conclude that the higher animals had existed as lower, even as the lowest, species?

P. Yes, since it agrees with the history of the development of the animal kingdom and with the natural law for the perfecting of all living organisms. After they had arrived at a certain maturity, passing through many generations, the living principle, which we have called the life ether, has enabled them to evolve higher species.

D. And so they could gradually work themselves up until they became man?

P. According to Darwin and his followers they have already done so. But let us keep to the actual man—let us leave out of considera-

tion for the present the problematical growth of the monad to the vertebrate animal through the monkey to man.

25. The lingering for a time on a step of learning instead of hurrying over it depends upon the nature of the growth towards perfection. It is only after having absorbed into itself all that the lower step provides for its development that strength is won to attain to the next higher grade.

26. So the lingering in a certain grade of development, not merely the reaching it, is necessary in order that the living organism may become more perfect, and that must lie in the plan of the world.

27. For the interest that Nature takes in the matter, as shown by the fact that the living organism not only is born, reproduces itself, and dies, but must also tarry awhile in a certain grade, is proved by the circumstance that it is given as companion hunger, a painful sensation the strength of which compels the individual to obtain nourishment to the end of its life.

28. Nature has, for the preservation of the individual, coupled it with the need of food and insured it by hunger. For the preservation of the species she has also implanted very strong

sexual feelings, although these are not quite so powerful an impulse, for the sexual impulse rests, not upon a sense of pain, but upon one of pleasure, whose impulse can be rendered inactive by will, through the emotions, or by work; and, furthermore, it is not active during the whole period of life. (It is absent in the child or the aged, and only present during the mating season in animals.)

29. The instinct for self-preservation, the strongest impulse given by Nature to every being without exception, shows that Nature did not intend us to hurry through life, but to rest awhile at this grade, proving that such delay is essential.

30. The suicide, approaching a river in which he is about to drown himself, springs aside if, perchance, a runaway horse bears down upon him.

31. A long or a short time is immaterial when we are considering eternity.

32. All who have not been able to reach a certain stage of development owing to unavoidable circumstances in the course of one life—circumstances which might indeed have been beneficial to another being—must live this stage over and over again until the necessary perfection is won and the higher stage may be attained.

33. So suicide may end a momentary, wretched existence, but such an act would only be reasonable if it were absolutely certain that the soul had reached the perfection possible to this stage of existence—a certainty which no one can possess at any period of his life.

34. What unhappy being ever put an end to his life, saying to himself that in doing so he ended nothing, but only renewed the necessary pain and lengthened it out.

35. *D.* Therefore, to the arguments which the opponents to capital punishment bring forward, another—a biological one—might be added!

36. *P.* Yes, indeed. Human society has the duty of rendering murderers harmless, to safeguard itself against all serious criminals. But shall this security be gained by taking away from the criminal the possibility of further progress?

D. Certainly, if this security cannot be otherwise obtained, for with security of life, perfection of society would also be endangered.

So the safety of the nation requires that the enemy who does not surrender, or is not rendered powerless to fight, must be killed. The same may be necessary for the State with regard to citizens rising against it arms in hand, threatening to destroy law and order.

P. But how if the arrested murderer is in the power of society, and it has the means of protecting itself from him for the future without taking his life, and so preventing the still possible improvement in him during this stage of existence—shall they kill him notwithstanding?

D. Yes, for 'All they that take the sword shall perish by the sword.'

P. What! If, after he had committed murder, he still lived for years or decades in safe keeping; if through training, teaching, and human love he might be brought to acknowledge his fault, and, instead of an abandoned wretch, become a penitent, filled with human feelings; from the Christlike point of view, would not the Father of Lights, of whom the Scriptures tell us that He rejoices over the penitent sinner when he falls at His feet weeping and cries, 'Lord! Lord!'—would He not prefer to receive such a penitent from the hand of a true pastor of souls, who had patiently completed this labour, undismayed by the rebellious soul, undiscouraged by dullness, wickedness, and stubbornness? Or is He likely to prefer the home-coming soul, sunk in bestiality, that the devil may not be cheated of his due?

D. The theologians think so, and have their reasons for so thinking.

P. Then they may be justified by their theological consciences. Our biological consciences command: Thou shalt not kill, save only him whom thou must kill lest he kill thee. The same is required of the community, the State.

XII

PERFECTION (2)

1. NATURE has time for everything, and inexhaustible material; for all matter, physical as well as spiritual, returns to her again for disposal.

2. When Nature, with bounteous hands, scatters abroad ten thousand germs, and only one attains fertilization, she has squandered nothing.

3. Fallen blossoms which did not become fruit, perished fruit which did not become plants, abortions, the death of infants, all premature withering and decay, causes Nature no loss, nor does it hinder her purposes.

4. She sends forth afresh the living being who has not attained perfection or not advanced sufficiently, again and again upon the

same plane until she sees her command fulfilled.

P. Nature has time.

D. Certainly; it may be immaterial to Nature whether her will was fulfilled yesterday or a thousand years ago, whether it will be accomplished to-day or in ten thousand years; for, in comparison to eternity, a thousand years can be scarcely as a minute in the limited space of a human life. And for living beings, may it not be immaterial how long they remain behind in a low stage of development?

P. Yes, for plants and animals, for we have no reason to suppose that the lower species feel less contented in their condition than the higher.

One would almost be inclined to take the opposite view. The small, the most minute, those organisms which live a parasitic existence, have a far easier method of obtaining what they need than the more advanced organisms in their battle for existence.

D. But for the generality of mankind perfection is coupled with better conditions of life in every sense, and therefore with greater happiness.

P. So it is, even taking into consideration those savage tribes of men, those in the so-

called primitive state, giving themselves up solely to the satisfying of their purely vegetable needs, untroubled by even a shadow of thought, and, save for their form, hardly to be differentiated from the animals, living far more happily than cultured mankind.

But this would overlook the fact that, as a rule, only those among them who were young, strong, and healthy could be happy. But woe to them when ill, weak, old, and broken down, if they fall prey to the wolfish instinct of the 'strong and healthy in a state of nature!'

D. Well, then, it is not immaterial to man if Nature has time, but of the utmost importance to him that none be taken by her, and that he should be helped on as quickly as possible towards perfection.

P. As quickly as *possible*: that is the point at issue. Truly it was by no means immaterial to the Israelites whether they should be set free or remain slaves in Egypt for another hundred years, suffering bondage and shame.

But the measure of their suffering must be fulfilled first. When that time came, Moses arose, and before that they would not have followed him.

If one of the greatest benefactors to mankind —Friedrich von Spee, the Jesuit—had come

into the world a hundred years later, thousands more innocent women, after unspeakable horrors, from Protestants not less than Catholics, would have been delivered up as witches to a painful death.

It remains to be considered, however, that the motive which impelled that eminent man must long before have filled the minds of many another. But only in his day was mankind's growing perfection so far advanced, that the truth became ripe and could be given to them with success.

A truth is ripe when recognised by the majority of men's minds as truth, from what they have thought themselves, or immediately recognised as truth when declared to them. Then mankind gives immortality to those who proclaimed it.

If mankind be not ready to receive the truth, then is the cross set up, the funeral pyres glow, and the chains clank, according to the passing fancy of the people or their rulers.

Many a one had already, before the Jesuit, recognised the insanity of the belief in witches, but they thought that the time was not yet come; and to become martyrs themselves they had neither the requisite courage nor inspiration. Whether Nature in the perfecting of the human

into species in its progressive knowledge cannot work more rapidly, or whether she may not, and on what grounds, who is qualified to say? It is not given to us to think the thoughts of the Almighty. This is the true, the real

RIDDLE OF THE UNIVERSE.

But these are perhaps the only secrets of Nature whose veil will never be lifted by mankind in this stage of their existence. 'Donec homines in terra—ignorabimus.'

5. *D.* If all is in process of becoming perfect, then will our later generations be more kindly dealt with. In all respects they will have a much better time than we now have?

P. By the necessity of Nature. But, then, we may ourselves be those later generations, therefore nothing could be more foolish than for us to act on the supposition that *après nous le déluge!*

6. Everything that pertains to man and all that surrounds him progresses towards perfection.

7. What has become of the enormous, dangerous, voracious brutes of olden times? Elephants and rhinoceri are only feeble shadows of those colossal giants. Their hides of armour did not protect them from decay.

8. An armoured giant of antiquity could to-day be laid low by the smallest boy with a pistol.

9. Progressing in her art, one might almost think learning from and using the experience gained from her creatures, Nature withdrew into her workshop the heavily moving, thickly armoured giant animals, and formed in their stead smaller, lighter, and livelier ones. What she took away in protective armour she may have amply replaced by the greater perfection of sense and instinct.

10. As all movement in material Nature takes a wave-like motion, not progressing forward in a straight line, as the wave-mountain must follow the wave-valley, so the wave of becoming perfect strives forward and upward, a curve symbolizing its progress. The apparent downward motion is only illusionary; it indicates the gathering together of force to win the next higher grade.

11. So we must not be misled as to the continuous progress of mankind to perfection, and the friend of man need not despair if he perceives in the history of mankind that at times a higher grade of mental culture was reached than in a succeeding epoch, or even to-day.

12. When epochs of horror succeed a period

of mildness and gentleness, when a century of peace and mutual esteem is followed by one of furious, raging slaughter, even then this apparent retrogression has revealed itself as a stage of real progress.

13. Seldom, or, rather, never, was man's backsliding in culture so marked as when the ascent of the majority had been high.

14. Brutalities may have been equalled, or even exceeded, by former ones; worse horrors been perpetrated than putting out eyes, ripping up defenceless and helpless women and stuffing them with straw, dashing tiny children against stones, as has happened in our own times, and can hardly have been surpassed in ancient days or even in the Middle Ages.

15. But the disgust which mankind has shown at such deeds is not only an isolated display of feeling nowadays: it is the expression of the vast majority.

16. Art has proved itself to be an important factor in mankind's progress towards perfection. More important still is science, and most important of all natural science.

17. 'Artem non odit nisi ignorans' (Only the ignorant hate art). Everyone should learn to understand art, then will he love and, if possible, practise it.

18. But art must not be overvalued in respect to the culture of man, especially plastic art.

19. The arts of sculpture, architecture, and painting all flourished in antiquity and later, and produced glorious works, which cannot be touched, let alone improved upon, by the moderns, with all their technical aids; but these were not capable of illuminating the darkness in the minds of the men of those times.

20. What would those wild, dark, rough times of antiquity and the Middle Ages have been without the softening influence of art, which must have ennobled at least those who found employment in them and enjoyed the results?

21. If the ancient Teutons, who knew nothing of art, and who, when warfare did not call them, spent their time upon their bear-skins in carouse and dicing, had not had moral qualities of another kind than the nations in whose life art was important, no poem, no saga of heroes, would chant their praise, and history would recall only their excesses.

XIII

TELEOLOGY AND DYSTELEOLOGY (1)

1. THE higher living organisms could not continue to exist without physical sensation.

2. Hunger and thirst, if not satisfied, cause great agony; death, if not satisfied at all.

3. No creature dies of hunger or thirst, but, because it failed to attend to the ever more insistent craving for food and drink, of exhaustion and starvation.

4. The nerves, which send the consciousness of sensations to the mind, have various modes of conveying their messages — light, sound, heat, touch, etc. They indicate danger if they give their messages by the expression of pain.

5. The greater the danger to the organ which they serve, the more insistent their cry for help—the pain.

6. As a general rule, the most important organs for the living being are also the most sensitive; their nerves cry aloud for help on comparatively slight occasion.

7. Unimportant parts of the body, such as the hair and nails, are in themselves insensible; but as they are not altogether unimportant, their surrounding parts cry for help, if they are

threatened with complete destruction. We can cut our hair and nails, but cannot tear them out without pain.

8. Certain organs essential to life—lungs, heart, bloodvessels, liver, spleen, kidneys, etc. —may gradually undergo the gravest injury, threatening life (through micro-organisms, alcohol, atheroma, and other things), without the sensation of pain giving warning.

They show the danger by the alteration in their activity or their power of elimination.

9. A heart damaged in one of its valves, a cirrhotic contracted kidney, a lung gradually wasted by tuberculosis, inconvenience their unhappy owner by the disturbed functioning of the affected part, not by insistent, acute pain, which, as an expression of the gravest danger to life, would be continuously acute.

10. *D.* But, then, as soon as the membranes covering some of those parts of the body are attacked by disease, pain is manifested, often without avail. Why, then, the pain?

Why is toothache almost the worst of all pains? The teeth are in no sense essential organs of life; we can manage without them—as a matter of fact, most of us do in old age. Why should the skin of the finger-tips be more sensitive to pain, as to touch, than the skin of

the back of the hand? It is true that the nerves which have to convey to the consciousness the lightest sensation of touch must be more delicately constructed than others which do not perform this office. But would not those nerves be still more perfectly constructed were they able to do this without being more sensible of pain?

P. These points are closely related if we speak of purpose; but they cannot be laid aside with the simple explanations, 'That is bad,' or 'Nature has done well there all the same.' We must admit that in many bodily conditions imperfections exist. They cannot be ignored, even when we progress from the mere superficial view to understanding the function of the human organs from the history of their development from the germ-cell. Nevertheless, these and other imperfections do not present insurmountable difficulties to the idea that the whole organism is constructed with a view to the greatest amount of usefulness attainable, only we must not conclude that what is, was perfect to begin with; rather, as with all Nature's organisms, it is on the road to perfection.

11. Taking this as our starting-point, we would not even dare to say that the vermiform appendix attached to the human colon, which

is responsible for so much sorrow already, is any proof of the inadaptability of the human organism. It only marks a stage in the progressive development of humanity. We must therefore consider it as the survival of an organ previously required and now disappearing, and it remains for our acumen and experience to consider how we can guard against the danger arising from it until in the process of retrogression it has finally disappeared.

12. The same may be said of the coccyx, which appears to be superfluous, and makes itself disagreeably felt at times, and still represents the remnant of a tail in the human body.

13. The small toe, again, is another apparent superfluity, being of no use for standing or walking, and seemingly likely to disappear. Its imperfection is not due to maltreatment for generations by ill-formed boots.

14. We find the crippling of the small toe as far back as the most perfectly formed statues of Venus and other antiquities thousands of years old. These statues show the foot either bare or shod with sandals, whose thongs are so arranged that the small toe could not have been touched by them at all.

15. A scientist recently attempted to prove

the inadaptability of the human organism by showing that a lead bullet which had hit a man in the leg in 1870 could still cause lead-poisoning after a lapse of thirty years. He entirely overlooked the circumstance that the organism had for thirty years resisted the action of the lead poison, and only yielded when, owing to increasing age and consequent loss of strength, it was no longer able to prevent the action of the foreign body. It does not appear probable that an organism which showed such a capacity for resistance was so very imperfectly constructed.

16. Truly, the man who goes so far as to demand of organic Nature that she should show herself capable of ridding herself of all deleterious substances will only declare himself content when his stomach has learnt to digest stones, when he can quench his thirst unharmed with concentrated sulphuric acid, and enjoy without injury cholera bacilli as a piquant addition to his caviare sandwich—in short, when neither fire nor poison, neither stab nor blow, nor any other material circumstance, can harm the organized material any longer.

And for that time he may wait! Pain, sickness, and death will then, indeed, exist no more.

17. However much man is justified in feeling

himself as lord and ruler of all beings upon earth, it scarcely becomes him to rate the whole creation in relation to himself, and to hold that all which does not serve *his* purpose is purposeless, those things which can injure *him* as creation's mistake.

18. Man may, with his progressive knowledge, be able to utilize and rule for his own purposes both the constituents and organisms of the earth, to adapt and subject them; but he must not be misled by the power which more and more he gains over them till he fancies they are only there for his purposes. Natural philosophy keeps itself aloof from such overweening self-consciousness.

19. Every creation, whether man or animal or plant, is its own aim in Nature; that is to say, it exists for its own sake. The law of the survival of the fittest supports this view.

20. Does the cotton plant bloom and yield its harvest solely in order that Dr. Lahmann may be enabled to make underwear out of it? Were buffaloes produced solely in order that by their flesh American packers might become millionaires? Is skin grown on cattle and goats in order to clothe *our* extremities with gloves and boots?

21. Why the Almighty Creator, whom man has to thank for his existence, took an interest in causing rattlesnakes, scorpions, tigers, sharks, plague bacilli, and a thousand other such creatures, to arise is a problem like that of, why have not all flowers a scent as sweet as the rose? Many have none at all, and others smell abominably.

All such questions proceed from the perverted view that everything in Nature must stand in direct relation to man, and especially to the beloved Ego.

22. A keen lion-hunter, the owner of a menagerie, will consider the 'king of beasts' as an exceptionally fine product of creation. The (African) settler will consider the lion who breaks down his fences and carries off his cattle as a monster and curse of creation; and there are thousands of like instances.

23. Inasmuch as man must be convinced that there is a purpose and goal, even a reasonable goal, in the whole of Nature, it will scarcely occur to him that everything may be reasonless, without plan, merely fortuitous; that to search for an aim, a reason in every *single* creation and appearance, may be but a thankless and unfruitful task.

24. The purpose of an organ in an individual is

frequently self-evident; that the stomach and intestines, for example, were formed for the purpose of digesting nourishment could only be denied by a scientific pettifogger.

25. Various organs do not serve one purpose *only* in the living organism. The tongue is an organ of taste, speech, and touch; the skin not only acts as a covering to keep the body warm, it is also an organ of touch, and sustains as well the important function of ridding the body of deleterious matter, so that, if by scalding, burning, or any other accident, a third of its area is put out of action, the man must die. Even the eye is only apparently for the sole purpose of seeing; it has also the faculty of keeping the body in equilibrium. If a man tries to stand upon one leg with the eyes closed he will learn how much harder it is to do so than with the eyes open.

26. We may venture to hope that continued investigation will entirely reveal to us the purposes of the several organs and component parts of the individual. The purpose of the individual himself in its relation to the surrounding world we may safely let alone.

27. We need not hang our heads in despair over the insufficiency of our present inheritance of knowledge. Enough if, to begin with,

we acknowledge that every living organism has a right to exist for its own sake — if we realize that obvious imperfections are not eternally established by Nature, but that they are in process of attaining perfection ; and not least we ourselves.

XIV

TELEOLOGY AND DYSTELEOLOGY (2)

1. If in Italy some 2,000,000 acres of land remain uncultivated (*must* remain uncultivated, says Baumann, *loc. cit.*, p. 57) on account of malaria, and 2,000,000 men are yearly attacked by malaria, of whom 15,000 die, is that a proof of dysteleology—that is to say, of Nature's incapacity ?

2. Of course it is disabling, but only to man, who again places himself as the hub of the universe around which all must turn. These facts neither prove nor disprove a final cause or incapacity in Nature ; they only prove that our knowledge is incomplete.

3. In recent years Robert Koch has made the discovery that the malarial poison may be transmitted by the stings of certain varieties of mosquitoes, as has become widely known.

According to the climatologist R. W. Felkin, the Chinese and Japanese have known this fact for hundreds of years.*

4. Is it impossible, and not rather highly probable, that progressive investigation and experience will in time enable the science of hygiene to destroy the means of transmission —*i.e.*, those mosquitoes—as medical science discovered in quinine a remedy to their consequence, malarial fever in man?

5. And, when we have ascertained the method by which the mosquitoes may be exterminated, or the source from which they obtain the malarial poison dried up, and when the cultivation of those 2,000,000 acres of Italian soil is no longer prevented, then does dysteleology—the theory of no adequate cause —disappear, simultaneously with the disappearance of the pernicious mosquito?

6. Previous to the English doctor Jenner's brilliant discovery of the protecting power of cow-pox against small-pox in man, there was a yearly death-roll in Europe of some hundred thousand from small-pox. Many who escaped with their lives were blind, and many hundred thousands were disfigured for life. Then also,

* 'Notes on Tropical Climatology,' London, 1905.

Sir Philosopher, we must suppose that Nature was illogical and incapable.

7. And if in Europe in those countries where compulsory vaccination prevails these terrible diseases have now met their match, and can claim hardly more yearly victims than such accidents as may occur through a slate falling off a roof, has Nature suddenly become teleological—that is to say, intentional—because she created cow-pox, O Philosopher? Perhaps the affected cows may have a different opinion! But in Asia, where, owing to the lack of protective vaccination, small-pox still rages, we are again to regard Nature as dysteleological—without reasonable design, Sir Philosopher?

8. 'Haeckel is perfectly right in declaring that, according to teleology, there must be, not one God, but gods, who work against each other.'*

According to Haeckel-Baumann, if we ascribe design to Nature, we must perforce believe in a god who is interested in the growth of the malarial plasmodium, because with it he can cause sickness and death, and another god who finds pleasure in the growth of the cinchona-tree, because by it he can counteract the first one's endeavours. According to Haeckel-

* Baumann, *loc. cit.*, p. 58.

Baumann, again, we are obliged to believe in a god who delights in the crawling phylloxera, and another who revels in the vine.

9. If a man allows his cattle to devour fresh clover, and the cattle fall sick with wind and starve, this is not to be attributed to the ignorance or neglect of the herd, but (according to Haeckel-Baumann) to an evil god who caused the clover to develop a rapid production of gas in the stomach of the ruminant, subsequent to a good god having provided it with the clover for nourishment. We would be forced to the conclusion (again according to Haeckel-Baumann) that a good god sent the good weather for the pleasure of man and beast, while the evil god induced the bad weather to damage them. And in April weather we may well suppose that the two gods are having a hand-to-hand tussle, and that now one and now the other gets the best of it!

Such consequences, resulting inevitably from such a conclusion, that there are two gods working against each other, appear to clever and learned men to be compatible with scientific knowledge, and therefore more worthy of belief than the theory that the organic creation contains within itself reasonable purposes and goals.

10. There is to be found in human compre-

hension a standpoint which cannot be distorted by means of any philosophical dogma.

11. We conclude, from what occurs in the kingdom of living organisms, that they contain within themselves a design. It is, however, an unscientific pretension to think of attributing a special design to each component part of Nature, to every process in the organized world.

12. So far the time has not arrived when natural science can have nothing more to tell us, when her teachings can be grounded firm and immovable on the statement, the declaration, of the design in any single constituent or process of nature. That such a thing may be possible is uncertain, except when the design is obvious, as the stomach for digestion. Natural science, however, is not in the least a finished science.

13. In natural science the very newest discoveries tread upon the heels of the new more or less quickly, and the very latest explain their forerunners, and show to be false what was before held to be proved as true.

14. Philosophers should be more cautious in rating transitorily valuable teaching, especially in pathology based on recent discoveries, on account of their universal system.

15. Humoral pathology was apparently exploded by Virchow's cellular pathology; yet

even during his lifetime it has been succeeded by Robert Koch's discoveries in sero-therapeutics, which have again brought humoral pathology to the front.

16. In the case of some minute, simple, living organisms, we are able to decide as to their purpose owing to their action in Nature's economy, without on that account ascertaining that such is their only purpose.

Without putrefied bacteria, which disintegrate the residue of the living into their inorganic constituents and return them to Nature's great storehouse, all organic life would long since have been stifled.

17. A philosopher who would include in his view of the world the most recent results of modern bacteriology, the curative serums and other influences, might easily find himself in the annoying position of having to reconstitute his scheme of the cosmos.

18. Should we consider the putrefactive bacteria as being made by Nature with a useful purpose, when they, like the dogs in Constantinople, remove filth from the earth, or as deleterious, because they increase the torture of the unhappy being whose mortifying leg they transform into an ichorous, foul mass?

19. Bacteria may be pathogenic (poisonous)

to man; they may be harmless or useful to plants or animals, or the reverse. Sometimes they may be poisonous, at others innocuous, weakened, or unmarked in their action—just as an oyster may be a wholesome form of nourishment, and also, if obtained from contaminated waters, a deadly poison.

20. Are such things as this and similar processes of more importance to the question of design in Nature—the teleology or dysteleology in our view of the world—than the fact that a child gets stomach-ache from eating decayed fruit?

XV

CHANCE

1. 'In life we must reckon with Chance. In the end Chance is God.'* Can there be chance in a world in which everything, without exception, is subservient to natural laws—a world in which all cause and all effect exist and work in conformity with the law?

2. Does not chance owe its position in our thoughts to the circumstance that we are not always able to recognise the conformity to law in the events which happen?

* Anatole France, *Zeitgeist*, No. 47, 1905.

3. Is not the assumption of chance simply an avowal, more or less consciously made, of our incomplete knowledge of causation?

4. What does 'accidentally' mean but 'this has happened at this particular time and place without my knowing the cause'?

5. The conjunction of certain circumstances, a moving power to which we are compelled to ascribe the most important events concerning the history of mankind and Nature, cannot be set aside by the definition 'chance.'

In a world in which all is based upon order conformable to law, chance is the most impossible of all impossibilities.

6. As every effect is not by chance, but in conformity to law and governed by the cause, so every cause is itself the effect of a preceding cause, which is, again, the effect of a cause beyond, and so forth.

7. And so on until, according to the human capacity for logical thought, we must arrive finally at a First Cause, which is not the Effect of a previous one.

8. And because we are not able to trace the 'red thread,' which weaves itself uninterruptedly from cause to effect, onward to its conclusion, we fill the hiatus with 'chance,' when the

apparent want of continuity is due to our imperfect sight.

9. And thus chance is, in proportion to events —*e.g.*, when we are killed by a flash of lightning or when we win the great prize in the lottery— a cheerful or sorrowful stop-gap, by which, boldly throwing aside all natural laws, we cloak our ignorance.

10. Because chance represents and fulfils something which happens according to law, and because chance as a cause is itself only the consequence of other foregoing causes, and because chance must in this way arrive finally, by necessity of Nature, at the First Cause of all, therefore chance is not God, but it comes from God, Monsieur Anatole France!

11. It is indeed difficult to eliminate chance in all the trivial events and labours of daily life, to which our will is apparently able at any moment to give a different direction.

12. It is an unwelcome, even repugnant, idea that the Highest, the Holiest, should concern Himself even with the lowest, most ordinary and trivial actions and events of human life.

Nevertheless, even in these there is no room for chance; all is cause and effect. As in great, so in little things, for even the great consists only of a multitude of small things.

13. Those consoling words, 'Not even a sparrow falleth to the ground without your Father . . . ,' contain a deep truth, which accords also with natural science.

14. We do not require the childlike imagination.—God beckons and the sparrow falls. It is more Godlike to imagine that the natural causes and effects were so accommodated to each other that at a certain time in a certain place the sparrow must needs fall.

What else does the word 'Providence' mean?

15. We need not imagine that the Almighty works directly in each trifling event, but rather by intermediary means, by the concatenation of causes.

16. 'Minima non curat prætor' (The general cannot attend to trifles). But this is just the mark of the Divine, that provides for the smallest, humblest, most insignificant things not less than for the grandest, most magnificent, and imposing.

'Minima non curat prætor—sed Deus.'

XVI

APPENDIX

1. THERE are many people who do not care for Divine worship, but there is no one who would not, consciously or unconsciously, have respect, fear, or hope to yield to something existing outside the human sphere, something supernatural, transcendental. This attitude of mind belongs also to the religious kingdom, however extraordinary the religion of a single individual and its practices may appear.

2. To many the incalculable, the inevitable, is the god 'Chance'; to all the goddess 'Luck,' whose favours all hope for, whose caprices all fear.

3. Many a one who, with supreme contempt, denies all Divine action, and looks down upon faith, yet bows to superstition with anxious reverence, crying *Unberufen* (to avert misfortune). And he will attribute an influence upon his actions to a meeting with certain human beings or animals, to certain numbers or days, or some such nonsense, as bringing good or bad luck, and this although he be neither a hunter nor a sailor.

4. That which to the human understanding

appears so probable that nothing can be more probable according to anybody's experience or conclusions—that for us is truth.

5. To ascertain truth requires maturity of mind, capacity for logical deductions, and practice in working them out rationally by personal experience or the experience gained by others—that is, knowledge and its reasonable estimate.

6. Therefore, philosophy can only become the common property of men when all have reached this maturity of mind.

Which will be never.

7. Because mankind is constantly dying and renewing itself, there must always be unfledged minds which have not yet attained that maturity. Most probably that class of men whose comprehension will never attain the power of fathoming truth will never die out.

8. It is not everyone's *métier* to comprehend, or even fathom, truth, but in every man's heart there exists a feeling for what is the most probable. Many a one may call this 'commonsense.'

9. Even though, in reference to the capacity of man to become more perfect, we do not agree with Goethe's dictum* that reason will

* Von Eckermann, 'Gespräche mit Goethe,' p. 250.

never *become popular*, that it will always be possessed by the few who excel, still, we must agree with him that feeling may. So that the feeling for *truth* may become popular.

10. It does not matter whether anyone recognises the fact that there is a Creator after arduous investigations, after mature consideration of the facts of experience, and having scrupulously weighed every argument for and against, or whether he accepts the conception of the 'Cosmos,' which comes to him as a joyful Evangel, appealing directly to his feeling of truth. There are two different paths, but both lead to the same result.

11. The truth is the same, whether it is reached after serious, strenuous labour, or becomes manifest without effort by a message. But a message can only be believed.

12. Successive messages may appeal to the emotions as more trustworthy than their forerunners, and may replace that which has hitherto been accepted as truth.

Convictions won by strenuous labour stand firmer. They can only be overcome by argument, and so merged in other convictions.

13. The feeling for truth recognises its own weakness. If a new message is announced to

a man which might have power to change a cherished belief, he will refuse to accept it.

Conviction, knowing its own strength, will gaily bid defiance to every counter-argument. It does not regard like or dislike, but only pure recognition.

If the counter-argument prevails, the conviction adopts it immediately, and becomes changed, but firmer than ever.

14. If once the feeling for truth enters into contest with conviction, then we may often see feeling declare itself overcome by the weapons of conviction — argument — saying, 'Quite true,' whereas it is quite otherwise.

That does not always imply a bankruptcy of the feelings.

15. Because it is far easier to reach belief or unbelief than conviction, which presupposes knowledge and sagacity, the majority of mankind will always prefer credulity or incredulity, for which culture and intelligence are not required.

16. If the feeling for truth once alters its standpoint, it can only give an explanation which is founded upon itself, because it cares little or nothing for arguments.

An evangelistic Protestant, who for years has lived uprightly according to his creed,

without reflection, without doubts or scruples, by chance enters a Catholic church. There he feels the Divine service, with Mass, incense, and ceremonial, more elevating and impressive than that of his own church. This Protestant will be more easily converted than one who is bound to his creed by convincing arguments.

The same applies to a Catholic who feels more satisfied by the simpler forms of Protestant worship.

17. That which a person feels to be true can render him happy and yet be quite erroneous; it is in this way that Schiller's saying, 'Only error is life,' is to be understood.

18. The thinker strives to bring all that he feels to be true into line with his reason. If he does not succeed in this he corrects his feeling, not his reason.

There are clergymen who teach and practise thus, while others value feeling more highly than reason.

19. Convictions of truth and feeling for truth can neither be forced upon anyone nor withheld from them. Mankind received this knowledge early, and therefore those who thought or believed otherwise were simply put to death.

20. To put to death was ever the most

convenient remedy of the mob, high or low, for inconvenient ideas, even if the owner of them chanced to be the most noble of his contemporaries. If they could not deny their ideas, they might as well fall with them. The mob does not sacrifice itself, but others, for ideas.

21. Religious feeling is peculiar to human nature, and inseparable from it. What curious blossoms the tree, which has grown from it—religion—may have produced in the course of ages in the different nations of the earth, and also in individuals! How many of its fresh shoots may have been covered with the mildew of superstition and folly!

Nevertheless, religion will last as long as humanity itself.

22. It shows a complete misunderstanding of human nature, in which religion is rooted, if so-called educated classes decry religion as a bugbear, invented by the wiseacres in order to keep the populace within bounds.

23. As with religious feeling, so with its consequence, religion—it is not peculiar to a single people.

Religion is not national, but international.

24. On this account the (Roman) Catholic and Jewish religious systems have the ad-

vantage, for they use as the principal parts of their Divine service the same language in all countries—Latin or Hebrew. An advantage not only of practical value, but also of high ethical signification.

25. A member of either communion, be he never so far from his native land, is at home in God's house. He hears the familiar syllables in which God is worshipped in his own beloved home.

And besides this, it shows him that national differences, national interests and barriers, do not exist before God; that the sons of the most diverse nations have to regard themselves as children of the one Creator, and so brethren.

The Masonic Lodges are, if we may believe report, moved by the same considerations to make use of the same symbols in every land upon earth.

26. A religion will have an invincible power and persistence so long as mankind exist, the teachings of which are in accord with the emotions of men without exacting from them the abandonment of their reason; which does not prevent logical thinking, but demands it; which has nothing to add to or detract from its teaching on account of the experiences and discoveries of science; which gives to Cæsar that

which is Cæsar's—that is, does not hold in contempt the life of this world, but understands its worth and appreciates it; which gives to God the things which are God's—that is, does not overrate the things of this life, nor consider them to be all, by which all stands or falls; which does not impose duties upon man which are against Nature; a religion which makes a man strong and wise; which makes him more perfect; which restrains and purifies the lawless instincts still connected with man, and changes 'He who is against Me I will destroy' into 'The Lord enlighten him and give him peace.' The strongest religion will be such a one, and by its fruits it shall be known.

27. Happy is he to whom his religion can be also the highest reason. Happy he also to whom, like Schiller, no religion is in favour of religion.

28. But neither the childlike perception nor the common-sense of mankind will ever be persuaded, even by the most striking discoveries of natural science, that the Eternal, whose nature we imagine to be divine, whose Being we are not able to comprehend, is not the ultimate Cause of all things rather than mere atoms of material; that man has to build monistic altars to the cult of material atoms,

to those unimaginably minute parts of a substance, be it hydrogen, oxygen, or ether, or a yet undiscovered phantastical substance, the ultimate cause of all emotion or thought.

29. Haeckel opines that a great number of modern Churches will surrender in this century to 'the free congregations of monism,'* and some of his partisans are striving to turn his opinion into fact.

30. But first crush in the human heart the childlike perception of truth, first blind commonsense so that it can no longer distinguish between what is true knowledge in natural science and what is mere theoretical meanderings, and then, perhaps, you may hope that mankind will offer sacrifices upon monistic altars and adore atoms of hydrogen, zinc, copper, stone, carbon, and other material, pouring out to them their grief and woe, seeking from them consolation and hope.

CONCLUSION

THE more man investigates the component parts and active powers of Nature, the more he succeeds in raising the veil of all changes and

* 'Riddle of the Universe.'

chances in which Nature wraps herself, the further he penetrates into her inner being, the microcosm, so much the more will the workings of the great Architect be revealed to his reason, so much the more will his own existence appear to him majestic, because he will recognise it as a miraculous work.

And he will estimate it the more moderately the more he realizes what a petty part of creation his own puny self is. Petty in comparison to the creation of earthly matters, a nothing in respect to the world—nevertheless, a something of worth and dignity, for he also is a thought, a work of the Creator. Investigate Nature, O man! learn her laws, and divine the great Lawgiver.

You tiny worm of the earth, you mote in the universe, dare you say, '*I* deny Him; He is not'? Or can you puff yourself up with pride and boast, 'I know; such are His attributes'? Heaven and earth shall tell of the glory of the Lord; but you, be silent before the Lord, and hope in Him. I, at least, will do so.

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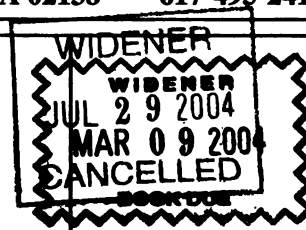

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